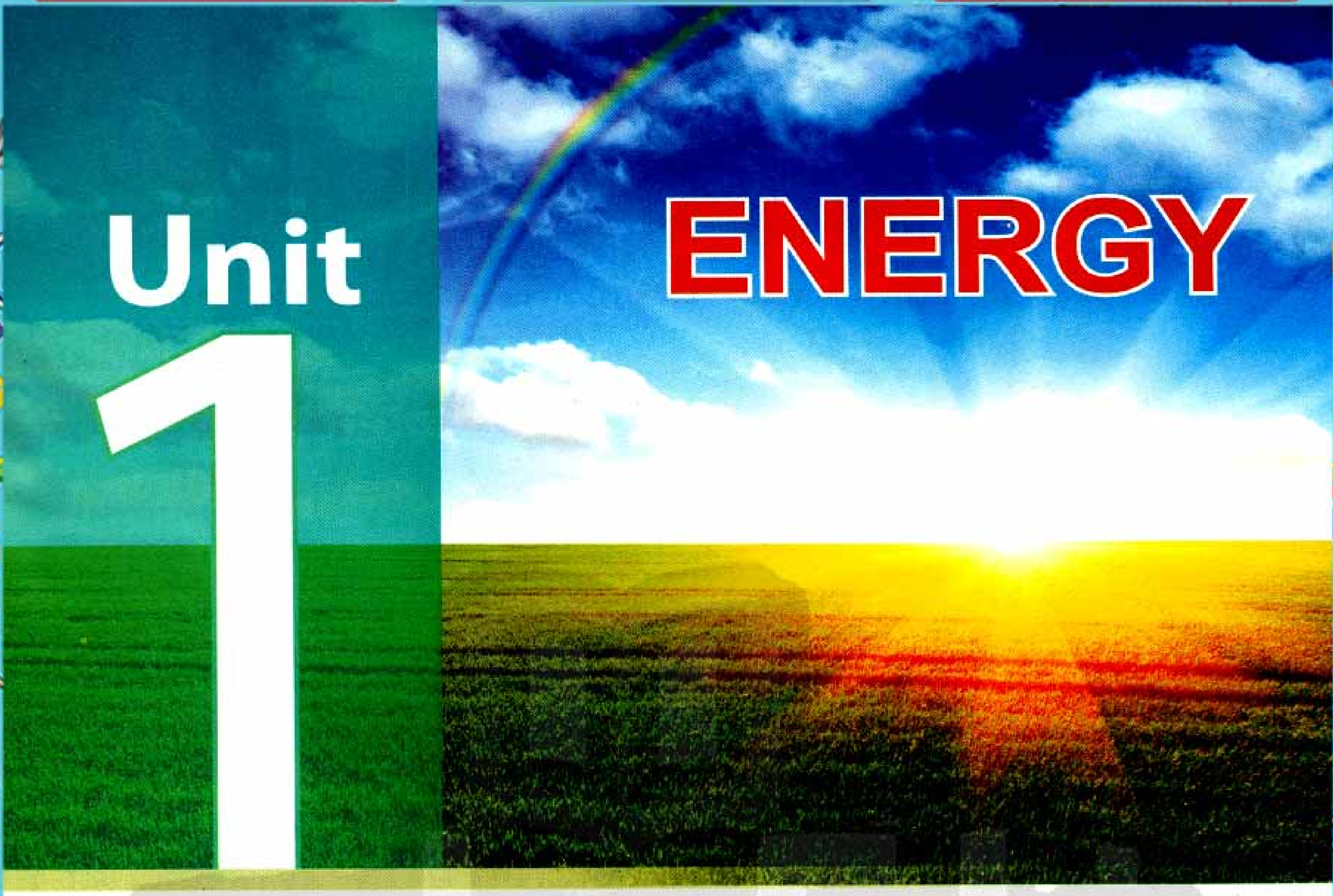


Unit 1 ENERGY

Lesson 1 Light

Lesson objectives:

- Exploring that light travels in straight lines.
- Classifying some materials according to the light passing through.
- Identifying light reflection, refraction and separation.
- Exploring that the visible white light can be separated into seven colors.

Lesson 2 Seeing colored objects

Lesson objectives:

- Explaining how opaque objects can be seen in different colors.
- Explaining how objects can be seen in different colors through colored transparent objects.
- Identifying the primary and secondary colors and lights mixing.

Lesson 3 Magnetism

Lesson objectives:

- Identifying the natural magnet properties.
- Classifying materials into magnetic and non-magnetic materials and identifying the magnetic field.
- Inferring that like magnetic poles repel and unlike ones attract.
- Inferring the composition and uses of the compass.

Lesson 4 Magnetism and electricity

Lesson objectives:

- Identifying the magnetic effect of the electric current (electromagnet).
- Performing experiments to know the basis of working of the dynamo (electric generator).



LESSON 1

Light

What is Light?

- Light is necessary for photosynthesis process, lighting of houses and streets, etc.
- Light is the most important energy on Earth.


The sun


Artificial light


Street lights

- **Light is the form of energy that can be seen and causes vision.**

There are other forms of energy which cannot be seen such as:

Heat energy | Electric energy | Potential energy | Kinetic energy | Sound energy, etc.

light	الضوء	photosynthesis	البناء الضوئى	process	عملية
energy	الطاقة	artificial	صناعى	street lights	إنارات الشوارع
vision	الرؤية	heat energy	طاقة حرارية	electric energy	طاقة كهربية
potential energy	طاقة وضع	kinetic energy	طاقة حركية	sound energy	طاقة صوتية

The visible spectrum

- The light energy which can be seen is called the visible spectrum.

The visible spectrum

- It is the light energy which can be seen.

Sources of light

- The following figures represent some sources of light.



- The sun is the main source of light on the earth.



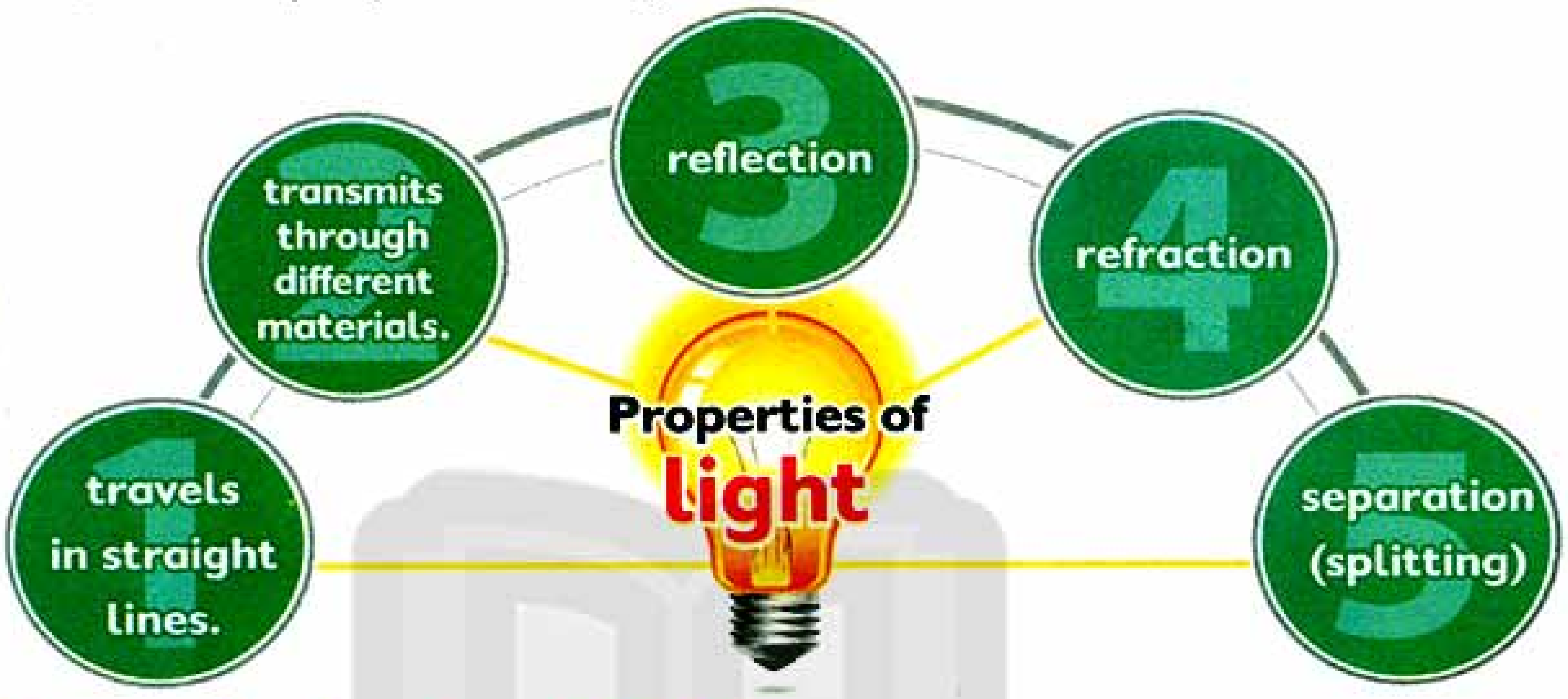
- Moonlight is the reflection of the sunlight that falls on the moon's surface.

G.R. **The moon seems shiny, but it is not considered a source of light.**
Because it reflects the sunlight that falls on its surface.

visible spectrum	الطيف المرئى	shiny	مضىء/ لامع	natural sources	مصادر طبيعية
source	مصدر	sunlight	ضوء الشمس	moonlight	ضوء القمر
reflection	انعكاس				

Properties of light

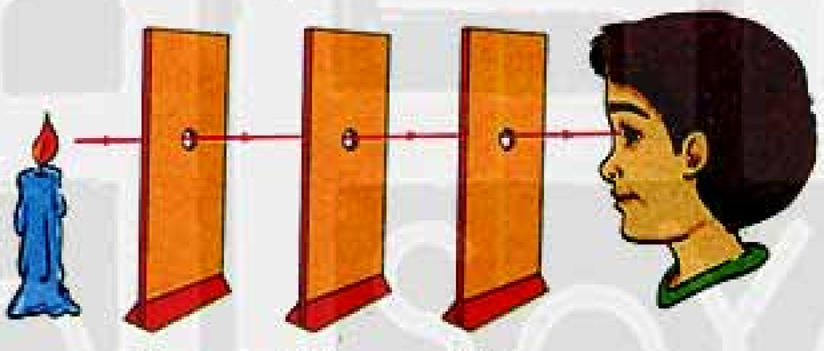
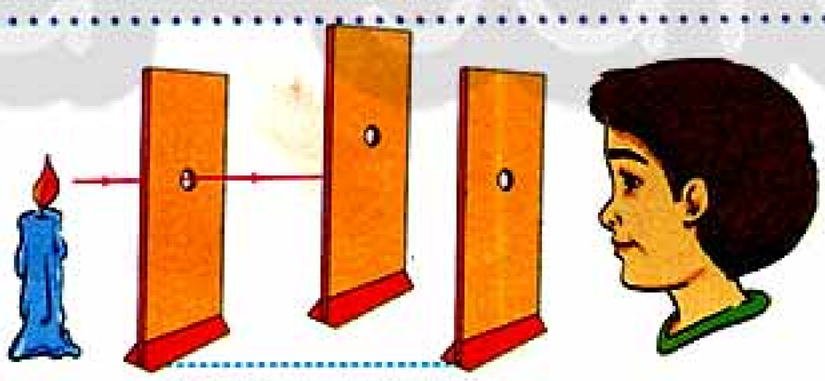
▶ We can summarize the properties of light as follows:



1. Light travels in straight lines:

Activity To show that light travels in straight lines:

Materials Three carton partitions; each one contains a centered hole - a candle (light source).

Steps	Illustration	Observation
(1) Put the three carton partitions on a straight line in front of the light of the candle. (2) Look at the candle light through the hole of partition (C).		You can see the candle light (flame).
(3) Move partition (B) to the right or left as shown in the figure.		You cannot see the candle light (flame).

Conclusion Light travels in straight lines.

Do you know?

- Laser is a light beam that travels a long distance without fainting and we can control the thickness of the light beam.
- We use laser beam in medicine and computers.

properties	خصائص	straight lines	خطوط مستقيمة	partition	حاجز
centered hole	ثقب فى المركز	candle	شمعة	flame	لهب

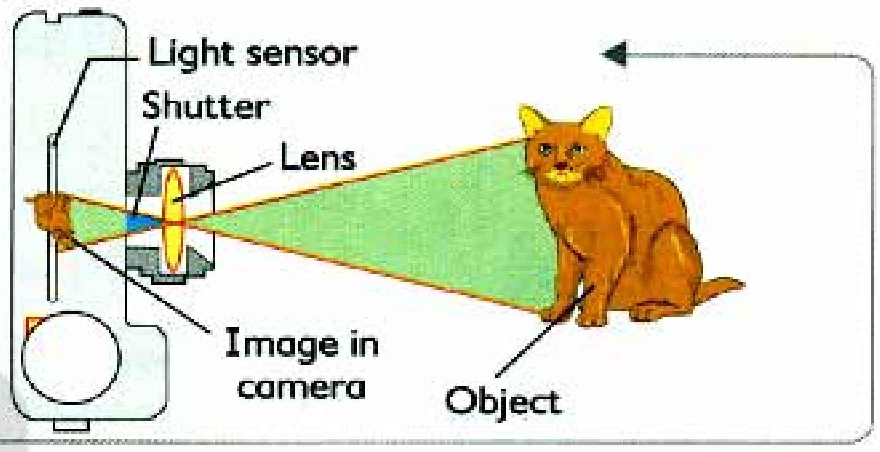
Applications on the traveling of light in straight lines

Traveling of light in straight lines causes some phenomena such as:

A. The formation of images by using narrow holes **B.** The formation of shadow

A. The formation of images by using narrow holes

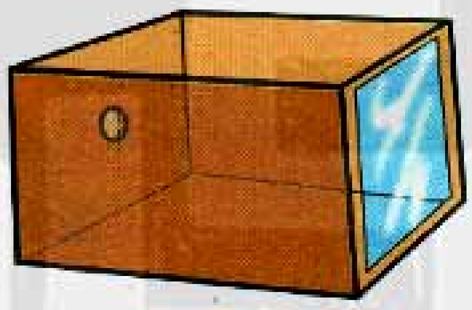
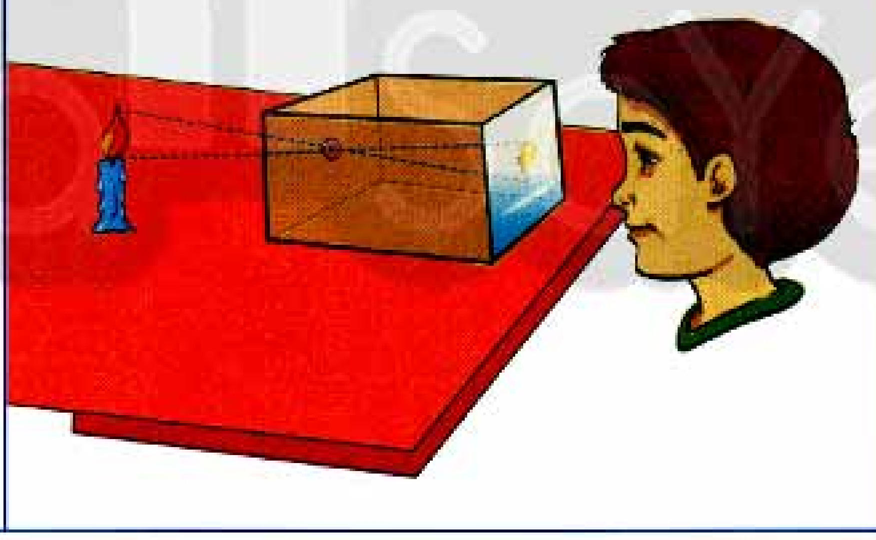
The idea of the photographic camera is based on the idea of the formation of images by using narrow holes.



Activity To show the formation of images by using narrow holes:

Watch Video

Materials A carton box - a candle (light source) - a piece of semi-transparent paper.

Steps	Illustration	Observation
(1) Remove one side of the box, then put a piece of semi-transparent paper instead. (2) Make a small hole in the opposite side of the semi-transparent side.		
(3) Light the candle and put it in front of the hole at a certain distance, then look at the semi-transparent paper. (4) Move the candle forwards and backwards until you see the candle image clearly on the semi-transparent paper as shown in the opposite figure.		A minimized and inverted image of the candle is formed on the semi-transparent paper.

Conclusion The formation of images through narrow holes is due to traveling of light in straight lines.

G.R. **The formation of images through narrow holes.**
Because light travels in straight lines.

phenomena	ظواهر	formation	تكوين	images	صور
narrow holes	ثقوب ضيقة	photographic camera	الكاميرا الفوتوغرافية	semi-transparent	شبه شفاف
remove	يزيل	minimized	مصغرة	inverted	مقلوبة

B. The formation of shadow

When you look at the ground during walking on a sunny day, you can see a darkened area that represents your body. This is your shadow.



Shadow

- It is the darkened area which is formed as a result of light falling on an opaque object.

Activity To show the formation of shadow:

Material A light source.

Steps	Illustration	Observation
1 Darken the room, then put your hand between a light source and a wall.		A darkened area is formed on the wall which is called shadow.
2 Change the position of your hand with respect to the light source.		As the object approaches the light source, the shadow area increases and vice versa.

Conclusion The formation of shadow is an evidence that light travels in straight lines.

N.B.
- The shadow area changes by changing the position of an object from a light source.
- The nearer the object to the light source, the bigger the shadow and vice versa.

shadow	ظل	ground	الأرض	darkened area	منطقة مظلمة
opaque object	شىء معتم/ غير شفاف	darken	أظلم	change	غيّر
position	موضع	with respect to	بالنسبة إلى	approach	يقترب
increase	يزيد	vice versa	العكس بالعكس	evidence	دليل

2. Light transmits through different materials:

- Look at the following figures to identify the ability of different materials to transmit light through.
- The materials can be classified according to their ability to transmit light into:

1 

Transparent materials

1. They are the materials that allow most light to travel through.
2. Things can be seen clearly (in full details) behind.

Ex. air, clear water, glass windows, transparent plastic.

2 

Semi-transparent (translucent) materials

1. They are the materials that allow some light to travel through.
2. Things can be seen less clearly behind than the transparent ones.

Ex. tissue paper, screen doors, frosted glass.

3 

Opaque materials

1. They are the materials that do not allow light to travel through.
2. Things cannot be seen behind.

Ex. carton paper, wood, foil, human body.

N.B. Opaque materials are used to cover glass windows as in photographic rooms.

G.R.

1. **The human body is an opaque material.**
   Because it does not allow light to travel through and things cannot be seen behind.
2. **The glass window is a transparent material.**
   Because it allows most light to travel through and things can be seen clearly behind.

transmit	ينتقل	different materials	مواد مختلفة	ability	قدرة
transparent	شفاف	in full details	بتفاصيل كاملة	semi-transparent	شبه شفاف
tissue paper	مناديل ورق	screen doors	أبواب زجاجية	frosted glass	زجاج بلورى
wood	خشب	foil	رقاقة معدنية	clay forms	أشكال صلصال

(Guide Answers: P. 2)

Benchmark

Selected from Previous Exams

1 Complete the following:

1. The image formed by the narrow holes is .... and .... (Cairo 2016 / Giza 2017)

2. .... materials allow some light to pass through, while .... materials do not allow any light to pass through. (Cairo, Rod El Farag 2016)

2 Choose the correct answer:

- Light transmits in .... lines. (Cairo 2016 / Qalubia 2017)

  a. curved b. broken c. straight d. zigzag

3 Write the scientific term:

1. The materials which you can see objects clearly behind and in full details. (Giza, El-Agoza 2016) (..............................)

2. The darkened area formed as a result of light falling on an opaque object. (Giza 2017) (..............................)

3. Light energy that can be seen. (Giza2017) (..............................)

4 Correct the underlined word:

1. The image formed by pinhole camera is upright. (Cairo 2016, Cairo 2017)

2. The light travels in curved lines. (Cairo 2017)

Try to solve Worksheet 1 Page 3

5 Give a reason:

- The formation of shadow. (Suez 2015 / Giza 2017)

....

6 Put (✗) or (✓):

- The body nearer to the light source has the greater shadow. (Assuit 2017) (   )

3. Light reflection:



- If you stand facing a mirror, you can see your image across it.
- The distance between your body and the mirror is equal to the distance between your image and the mirror.
- If you are standing 1 m away from a mirror, then:
  1. Your image will be formed 1 m behind the mirror surface (inside the mirror).
  2. The distance between your body and your image is
     1 m + 1 m = 2 m.

How can we see things surrounding us?

We can see things because they **reflect** the falling light on them to reach our eyes causing the vision.

Light reflection requires:
1. A source of light
2. A reflecting surface

G.R. **We cannot see in the dark.**
Because there is no light, so light will not reflect on objects to our eyes.

Light reflection

- It is the bouncing (going back) of light rays when they fall on a reflecting surface.

Types of light reflection: Light reflection can be classified according to the reflecting surface into:

1 Regular reflection

- It is the reflection of light when it falls on a smooth or bright (shiny) surface.





(smooth surface)

- Light rays are reflected in one direction.

Ex. A plane mirror.

2 Irregular reflection

- It is the reflection of light when it falls on a rough surface (containing protrusions and tiny holes).





(rough surface)

- Light rays are reflected and scattered in different directions.

Ex. Paper - Rock.

reflection	انعكاس	bouncing	ارتداد	reflecting surface	سطح عاكس
regular	منتظم	smooth	ناعم	irregular	غير منتظم
rough	خشن	protrusions	نتوءات/ بروزات	scattered	انتشرت/ تبعثرت

4. Light refraction:



- Look at a pencil inside a glass of water, could you explain why the pencil appears broken at water surface?
- This phenomenon results from the refraction of the reflected light rays coming from the immersed part of the pencil under water surface.

Light refraction

- It is the change in the direction of light rays when they pass through the separating surface between two different transparent media.

Explanation . . .

- The reflected light rays from the upper part of the pencil travel in air.
  - So, they do not refract.
- The speed of light through air is greater (faster) than its speed in water.
  - So, light refracts (changing its direction) when it travels between two different transparent media such as air and water.

G.R. **The pencil appears broken when it is put in a glass of water.**
Due to light refraction between two different transparent media (air – water).

Checkpoint:

Give a reason for each of the following:

1. Light rays refract when they travel between two different transparent media.

   ....

2. The spoon seems broken when it is put in a glass of water.

   ....

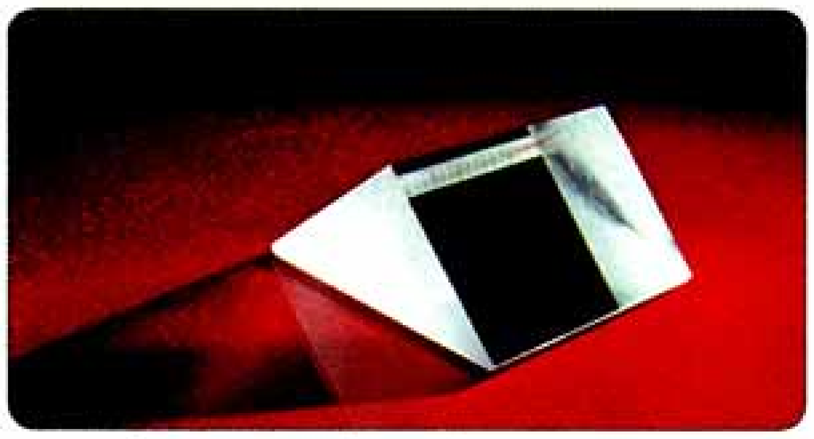
Complete the following sentence:

The speed of light in air is .... than in water.

refraction	انكسار	result from	تنشأ من	light rays	أشعة الضوء
immersed part	الجزء المغمور	change	تغيير	direction	اتجاه
separating surface	سطح فاصل	media	وسائط	light speed	سرعة الضوء

5. Light separation:

- White light consists of seven spectrum colors.
- A glass prism is used to separate the white light into seven spectrum colors.



A triangular glass prism

Light separation

- It is the separation (splitting) of white light into seven spectrum colors.

Activity

To show that the visible white light can be separated into seven spectrum colors:

Materials A white paper – a triangular prism – coloring pencils.

Steps	Observation
1. Put the white paper and let the rays fall on it. 2. Adjust your position where the sun is behind you. 3. Put the triangular prism and let sunlight shine through. 4. Move the prism until the sunlight coming from it strikes the white paper. 5. Continue moving the prism until you see different colors. 6. Draw the colors you have seen using the coloring pencils.	**Seven spectrum colors are formed on the white paper.**  1. Red 2. Orange 3. Yellow 4. Green 5. Blue 6. Indigo 7. Violet

Conclusion The visible white light is made up of seven spectrum colors.

N.B. Light separation causes some phenomena such as: the rainbow.

separation	انفصال	spectrum colors	ألوان الطيف	triangular prism	منشور ثلاثى
coloring pencils	أقلام تلوين	adjust	اضبط	rainbow	قوس قزح

Spectrum colors

- The visible spectrum consists of seven colors.
- On passing white light through a glass prism, it separates into seven spectrum colors:



Red
Orange
Yellow
Green
Blue
Indigo
Violet

- Sunlight is an excellent example of white light.
- Mixing seven spectrum colors produces white light.

Passing white light through 2 prisms:

- On using two prisms opposite each other as shown in the following figure:
  1. White light separates into seven colors when passing through the first prism.
  2. Then, the seven colors accumulate again into white light when passing through the second prism.



G.R.

1. White light can be separated.
Because it consists of seven spectrum colors.

2. Sunlight is an excellent example of white light.
Because it consists of seven spectrum colors.

on passing	عند مرور	separate	ينفصل	indigo	اللون النيلى

The rainbow



Spectrum colors

1. Red
2. Orange
3. Yellow
4. Green
5. Blue
6. Indigo
7. Violet

We can see the rainbow in the sky during or after rain.

G.R. Due to separation of white light into seven spectrum colors, as a result of passing of sunlight through water droplets during rainfall or through the suspended droplets in air, so the drops of rain water act as a prism.

Try to solve Worksheet 2 Page 5

water droplets	قطرات الماء	rainfall	هطول الأمطار	suspended	معلق

Brief

The visible spectrum It is the light energy which can be seen.

There are two types of light sources which are:

1. **Natural sources** such as: (the sun - stars)
2. **Artificial (man-made) sources** such as: (electric lamps - candles)

Properties of light

1. Light travels in straight lines:

Some phenomena happen as light travels in straight lines:

a. The formation of images by using narrow holes

b. The formation of shadow

Shadow: It is the darkened area which is formed as a result of light falling on an opaque object.

2. Light transmits in different materials:

The materials can be classified according to their ability to transmit light into:

1. **Transparent materials** such as: (air - clear water)
2. **Semi-transparent (Translucent) materials** such as: (tissue paper)
3. **Opaque materials** such as: (wood - foil)

3. Light reflection: It is the bouncing (going back) of light rays when they fall on a reflecting surface.

4. Light refraction: It is the change in the direction of light rays when they pass through the separating surface between two different transparent media.

5. Light separation: It is the separation of white light into seven spectrum colors.

Exercises on Lesson 1

Guide Answers P. 2

Solve Ex.

1 Choose the correct answer:

1. The light rays that can be seen are called .... *(Dokki, GLS 2016)*
   a. visible spectrum b. infrared rays
   c. ultraviolet rays d. all the previous answers
2. The main light source on the earth's surface is the ....
   a. moonlight b. electric lamp c. sun d. lighted candle
3. Light transmits in .... lines. *(Gharbia 2015 / Qalubia 2017)*
   a. curved b. broken c. straight d. zigzag
4. The characteristics of the object's image that is formed through narrow holes are .... *(Cairo 2017)*
   a. minimized and inverted b. enlarged and inverted
   c. minimized and upright d. enlarged and upright
5. The nearer the object to a light source, the .... the shadow.
   a. smaller b. bigger c. fainted d. all the previous answers
6. When the light falls on an opaque body, ... is formed. *(Cairo 2016)*
   a. no image b. white light c. shadow d. no correct answer
7. The materials which allow some light to transmit through are called .... *(Qalubia 2017)*
   a. translucent materials b. opaque materials
   c. transparent materials d. all the previous answers
8. Light cannot pass through .... materials. *(Cairo 2017)*
   a. transparent b. opaque c. semi-transparent d. translucent
9. All the following are examples of translucent materials except ....
   a. tissue paper b. light bulbs c. screen doors d. carton paper
10. We can see objects due to the .... of light on them.
    a. reflection b. refraction c. shadow d. spectrum colors
11. In regular reflection, light rays are reflected in ....
    a. one direction b. two directions c. three directions d. four directions
12. Light is reflected .... when it falls on a smooth and shiny reflecting surface. *(Cairo 2017)*
    a. irregularly b. and refracted
    c. regularly d. and scattered

13. If the distance between an object and a plane mirror is 20 cm, then the distance between the image and the mirror is ....
    a. 30 cm b. 40 cm c. 20 cm d. 10 cm
14. Light .... when it passes from water to air.
    a. reflects b. refracts c. absorbs d. separates
15. A pencil seems as if it's broken at water surface due to .... of light. *(Cairo Exp. LS 2015 / Cairo 2017)*
    a. refraction b. reflection c. separation d. no correct answer
16. Light speed in air is .... that in water.
    a. slower than b. faster than c. the same d. twice
17. The third color in the spectrum colors is .... *(Dakahlia 2016 / Kafr El-Sheikh 2015)*
    a. red b. yellow c. green d. violet
18. The visible white light is made up of .... spectrum colors.
    a. five b. six c. seven d. ten
19. A rainbow is formed when light rays pass through the ....
    a. droplets of rain water b. water surface
    c. triangular prism d. cold water surface
20. The orange color in the visible spectrum colors lies between the .... colors.
    a. yellow and blue b. red and yellow
    c. blue and violet d. green and indigo
21. The spectrum color that comes just before indigo is .... *(Cairo Exp. LS 2015)*
    a. yellow b. red c. blue d. violet

2 Complete the following sentences:

1. The light energy which can be seen is called the ....
2. There are forms of energy which cannot be seen like .... , ... and ....
3. Moonlight is the reflection of the .... that falls on the moon's surface.
4. Light travels in .... lines. *(Cairo 2017 / Port Said, ELS 2012)*
5. The formation of images by using narrow holes is due to traveling of light in ....
6. The formation of shadow is due to traveling of light in ....
7. The idea of the .... is based on the idea of the formation of images through narrow holes. *(Cairo 2017)*

8. .... is the darkened area which is formed as a result of light falling on an opaque object.
9. The farther the object to a light source, the .... the object's shadow.
10. 📖 The material through which light can transmit is called ....
11. 📖 Light can easily transmit through .... materials.
(Giza, Dokki 2016 / Cairo, El Nozha 2015)
12. Materials can be classified into .... and .... according to the amount of light that transmits through.
13. A tissue paper is an example of .... materials, while a piece of rock is an example of .... materials.
14. .... materials allow some light to pass through, while .... materials do not allow any light to pass through. *(Rod Elfarag, Cairo 2016)*
15. 📖 Light bouncing after falling on an object is called ....
16. 📖 Light reflects when it falls on a/an .... surface.
17. Light reflection can be classified into .... and ....
18. The reflection of light on a smooth surface is .... while its reflection on a rough surface is ....
19. In irregular reflection, light rays are reflected and .... in different directions.
20. The image formed by narrow holes is .... and ....
(Al-Obour 2015 / El-Sayda 2016)
21. We can see objects due to .... *(Cairo 2017)*
22. Light .... when it falls on mirror, while it .... when it passes between two different transparent media. *(Dokki 2016 / Sinai Central L.S. 2015)*
23. 📖 The change in the direction of light rays when they pass through the separating surface between two different transparent media is called ....
24. Light .... is clearly shown by putting a pencil inside a glass of water.
25. 📖 When a light ray passes from a glass rod to air, it ....
26. 📖 White light (sunlight) can split into .... colors that are called ....
(El-Sharkia 2016)
27. .... appears in the sky after rainfall due to splitting of light into 7 colors.
(Cairo 2016)
28. 📖 The prism separates sunlight into .... *(Dakahlia 2015 / Menofia 2016)*
29. We can see the .... when sunlight passes through water droplets during rainfall.

3 Put (✓) or (✗) in front of the following statements and correct the wrong ones:

1. The visible spectrum is the light energy which cannot be seen. ( )
2. 📖 Light transmits in straight lines. *(Cairo 2015)* ( )
3. 📖 The moon seems luminous as it absorbs the sunlight. *(Assuit 2017)* ( )
4. 📖 The shadow of an object is formed because light travels in curved lines. ( )
5. Shadow is the darkened area which is formed as a result of light falling on an opaque object. *(Basateen 2016)* ( )
6. 📖 The nearer the object to a light source, the bigger the shadow. *(Assuit 2017)* ( )
7. 📖 The formed image through narrow holes is upright. *(Cairo 2016)* ( )
8. 📖 The picture formed in the mirror is inverted. *(Giza 2017)* ( )
9. The main source of light on the earth is electrical bulbs. *(Giza 2017)* ( )
10. The material which we can see objects clearly behind is called a transparent material. ( )
11. Aluminum is a semi-transparent material. *(Cairo 2016)* ( )
12. 📖 Carton paper is an opaque object. *(G.L.S. 2016)* ( )
13. Light bouncing after falling on an object is called light refraction. ( )
14. Regular reflection is formed when light falls on a smooth surface. *(El-Nozha 2016)* ( )
15. 📖 In irregular reflection, light rays are reflected in one direction. ( )
16. Light reflection is clearly shown by putting a pencil inside a glass of water. ( )
17. When a light ray passes through a glass prism to air, it refracts. ( )
18. Once the seven spectrum colors accumulate with each other, you can see blue light. ( )
19. We can see the spectrum colors when sunlight passes through water droplets during rainfall. ( )
20. 📖 Red is the first color in the spectrum colors and violet is the last one. ( )

4 Write the scientific term for each of the following:

1. 📖 The light energy which can be seen. (..........................)
   (Cairo 2012 / Giza 2017)
2. The main light source on the Earth's surface. (..........................)
   (Giza, 6th of October City L.S. 2012)
3. 📖 A darkened area formed as a result of light falling on an opaque object. (..........................)
   (Menofia 2016 / Giza 2017)
4. 📖 The materials which you can see objects clearly behind and in full details. (..........................)
   (El-Agoza 2016/ El Haram 2015)

5. The materials that do not allow light to travel through and things cannot be seen behind. (..........................)
(Sharkia 2016 / Giza 2017)

6. The material that light never transmits through. (..........................)
(Exp. Sch. 2015 / St Joseph 2016)

7. The material that can be used to cover windows of photographic rooms for imaging. (..........................)

8. The material which allows only some light to pass through. (..........................)
(Dakahlia 2016)

9. The material through which objects cannot be seen clearly. (..........................)

10. The bouncing of light rays when they fall on a surface. (..........................)
(Alex 2015 / Cairo 2017)

11. The reflection of light when it falls on a smooth and bright surface. (..........................)
(El Montazah Alex 2015)

12. The reflection of light when it falls on a rough surface (containing protrusions). (..........................)
(El-Haram 2015, ELS 2016)

13. The change in the direction of light rays when they pass through the separating surface between two different transparent media. (..........................)
(Giza 2012 / 2017)

14. The phenomenon that occurs when sunlight passes through water droplets during rainfall. (..........................)

15. The tool which is used to separate white light into seven spectrum colors. (..........................)
(G.L.S. 2016)

16. The seven colors of light which sunlight is made up of. (..........................)
(Cairo, Mostakbal 2012)

5 Choose from column (B) what suits in column (A):

1.

(A)	(B)
1. The sun	a. occurs when sunlight passes through water droplets during rainfall.
2. Moonlight	b. separates light into seven colors.
3. The visible spectrum	c. is the reflection of the sunlight that falls on the moon's surface.
4. A prism	d. is the main source of light on the earth's surface.
	e. is the light energy which can be seen.

1. .... 2. .... 3. .... 4. ....

(Giza 2017)

2.

(A)	(B)
1. Light	a. is an opaque material.
2. Shadow	b. separates light into seven colors.
3. Glass	c. is a transparent material.
4. Carton paper	d. propagates (travels) in straight lines.
5. Prism	e. reflects sunlight.
	f. is the dark area which is formed behind a body exposed to light.

1. .... 2. .... 3. .... 4. .... 5. ....

(Sinai 2015)

6 Give a reason for each of the following:

1. The moon is not a source of light. *(Cairo 2017)*

....

2. The formation of images through narrow holes. *(Sinai 2015 / Assuit 2017)*

....

3. The formation of shadow. *(Dakahlia 2012 / Giza 2017)*

....

4. Glass windows and air are transparent materials.

....

5. Tissue paper is a translucent material while carton is an opaque one.

....

6. Objects can be seen clearly (in full details) behind transparent materials.

....

7. You can see your face in a plane mirror. *(Suez 2012)*

....

8. A spoon appears broken when you put it in a transparent cup of water. *(Cairo 2017)*

....

9. Sunlight can be separated. *(Alagoza 2016)*

....

10. The appearance of the rainbow in the sky during rainfall. *(El-Nozha 2016/ Cairo 2015)*

....

7 What happens if...?

1. You look at your image through a transparent material.

....

2. We look to a lighted object through a narrow hole. *(Cairo 2015)*

....

3. Sunlight passes through water droplets during rainfall. *(El-Montazah 2015)*

....

4. You look at a picture through carton paper.

....

5. You look at a mirror.

....

6. You look at a spoon that is put in a glass of water. *(Giza 2012 / 2017)*

....

7. White light passes through a prism. *(Gharbia 2016 / Giza 2017)*

....

8 What is meant by...?

1. The visible spectrum.

....

2. Shadow.

....

3. Transparent materials.

....

4. Translucent materials.

....

5. Opaque materials.

....

6. Light reflection.

....

7. Light refraction.

....

8. Light separation.

....

9 Compare between...:

1.

Transparent materials	Translucent materials	Opaque materials
....	....	....
....	....	....

(Giza 2017 / Cairo 2017)

2.

Regular reflection	Irregular reflection
....	....
....	....

3.

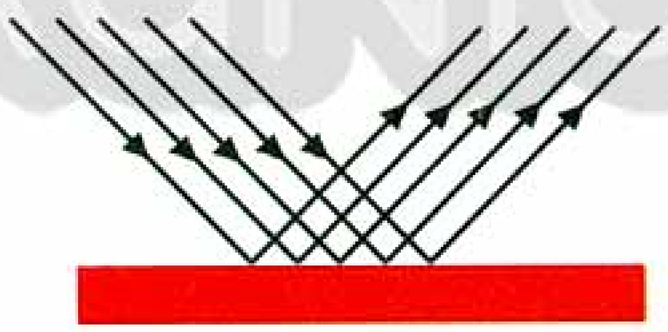
Smooth surface (according to light reflection)	Rough surface (according to light reflection)
....	....
....	....

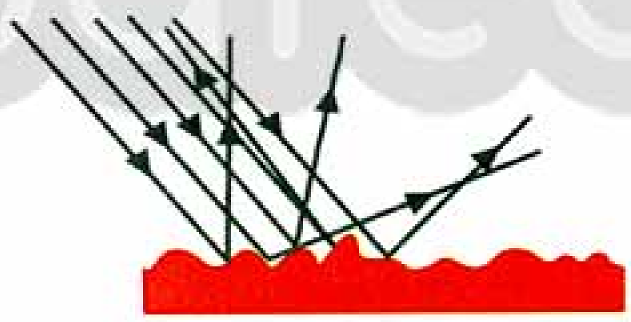
4.

Light reflection	Light refraction
....	....
....	....

10 Look at the following figures and then complete:

(Giza Edu. Admin. 2016)





1. .... reflection.

2. .... reflection.

11 Look at the opposite figure and then complete:



1. This figure shows the .... phenomenon.
2. This phenomenon is defined as ....
3. The two types of this phenomenon are .... and ....

12 **Look at the following figure, then answer:**



1. This figure shows the .... of white light into .... by a glass prism.
2. What happens when these seven colors accumulate with each other?

....

....

3. What is your conclusion?

....

13 **Explain briefly:**

1. The formation of shadow.

....

2. The formation of the rainbow.

....

3. The transmission of light through different materials.

....

14 **How can you prove experimentally that: Light propagates (travels) in straight lines?**

....

....

15 **Mention the apparatus that can be used in the separation of sunlight.**

(Kafr El-Sheikh 2015 / Giza2017)

....

16 **Write the function of:**

Prism .... *(Assuit 2017)*

17 **Look at the opposite figure then complete the following:**



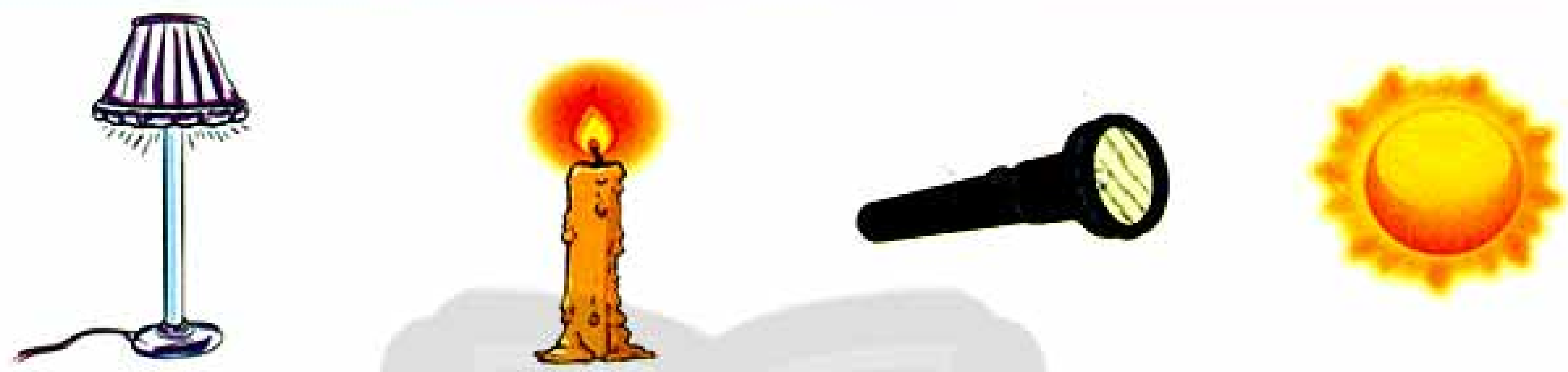
1. The following figure explains .... phenomena.
2. Velocity (speed) of light in air is.............................. than velocity of light in water.

(Assuit 2017)

TIMSS Like questions on Lesson 1

Guide Answers P. 4

1 **In this exercise, you will use and interpret information about how light travels.**



We can see objects that are luminous. They are sources of light.

a. Name the luminous objects shown above.

....

....

b. Name some other luminous objects:

- One in space ....
- One in your home ....

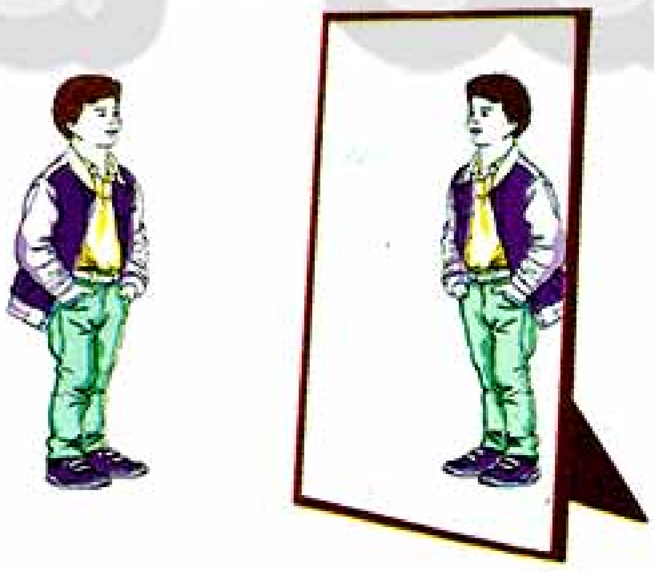
c. Are you a luminous or non-luminous object? ....

d. Explain how a friend can see you on a sunny day.

....

....

2 **The picture below shows a boy standing 2 m away from a plane mirror. The boy is 1.5 m tall.**



a. How far behind the mirror is the boy's image?

....

b. Is the boy's image in the mirror less than 1.5 m tall, equal to 1.5 m tall or more than 1.5 m tall?

....

3

a. Doaa investigates which materials allow light to pass through.
She holds different materials out in the sun.



Complete the table below to predict Doaa's results.

Tick ONE box in each row (the first one has been done for you).

Material	Some light passes through	No light passes through
Tissue paper	✓	....
Mirror	....	....
Clear plastic cardboard	....	....
Foil	....	....

b. When Doaa sits by a lamp, a shadow is formed.



. She wants to see if any other objects will cause a shadow in a dark room. She turns the lamp off.

. She sits in front of these objects instead of the lamp.


Television


Mirror


Plant


Night safety jacket

I. Which ONE of these four objects will cause the shadow of Doaa in a dark room?

....

II . Why is a shadow formed when Doaa sits in front of this object? Tick ONE box.

Because the object ....

is translucent. ☐ reflects light. ☐

is a light source. ☐ is transparent. ☐



LESSON 2

Seeing colored objects

Objects can be seen due to the reflected light rays from their surfaces. Blue shirt reflects blue light, so it looks blue. While the flower looks red, because it reflects the red light.

Red flower





Blue shirt

How can we see colored Objects?

What are the spectrum colors?

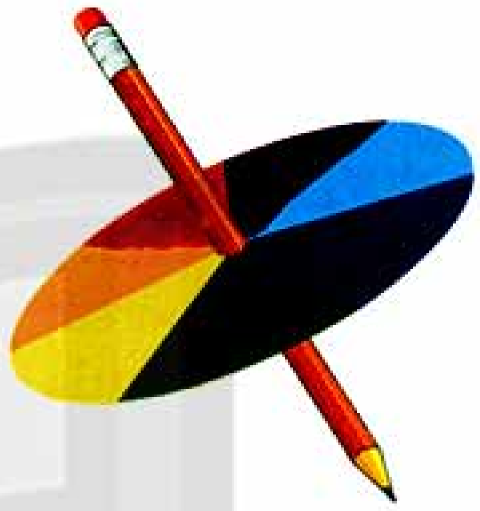
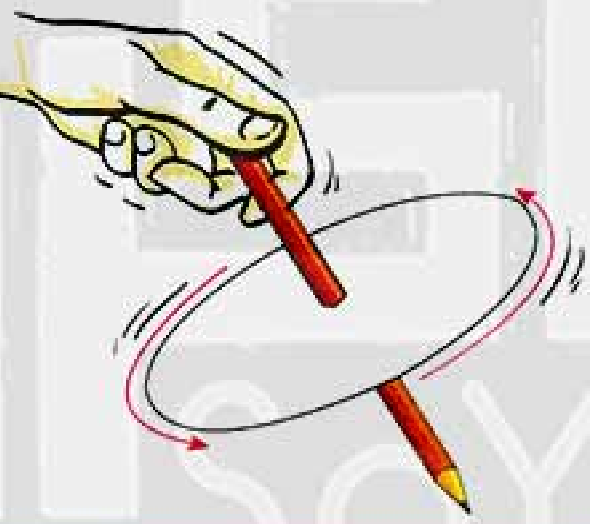
- The visible white light can be separated into seven spectrum colors by using a glass prism.
- The spectrum colors start with **red** color and ends with **violet** color.



colored objects	الأشياء الملونة	reflected light	الضوء المنعكس	surfaces	أسطح
reflect	يعكس	look	يظهر - يبدو	spectrum colors	ألوان الطيف
visible	مرئى	be separated	ينفصل	prism	منشور
start	يبدأ	end	ينتهى	violet	اللون البنفسجى

Activity To prove that mixing the spectrum colors produces the visible white light:

Materials A piece of white construction paper - coloring pens - a pencil - scissors - a protractor.

Steps	Illustration	Observation
1. Use the scissors to cut the construction paper into the shape of a disc. 2. Divide the disc into seven equal sectors (parts) by using the protractor. 3. Color the seven sectors (parts) with the spectrum colors in the same order. 4. Make a small hole in the disc center and pass your pencil through.		
5. Rotate the disc quickly.		The colored disc appears white.

Conclusion

- The visible white light is made up of seven spectrum colors.
- Mixing the spectrum colors produces the visible white light.

Complete the following sentences: Checkpoint:

1. The seven spectrum colors begin with .... and end with ....
2. By mixing the seven spectrum colors together, ... color is formed.
3. A glass prism is used to ....

mixing	خلط	construction paper	ورق مقوى	coloring pens	أقلام تلوين
scissors	مقص	protractor	منقلة	divide	قسِّم
sectors	قطاعات	color	لوِّن	same order	نفس الترتيب
hole	ثقب	disc center	مركز القرص	rotate	أدر
appear	يظهر				

Seeing colored objects

▶ We can classify the process of seeing colored objects as follows:

1 Seeing colored transparent and translucent objects

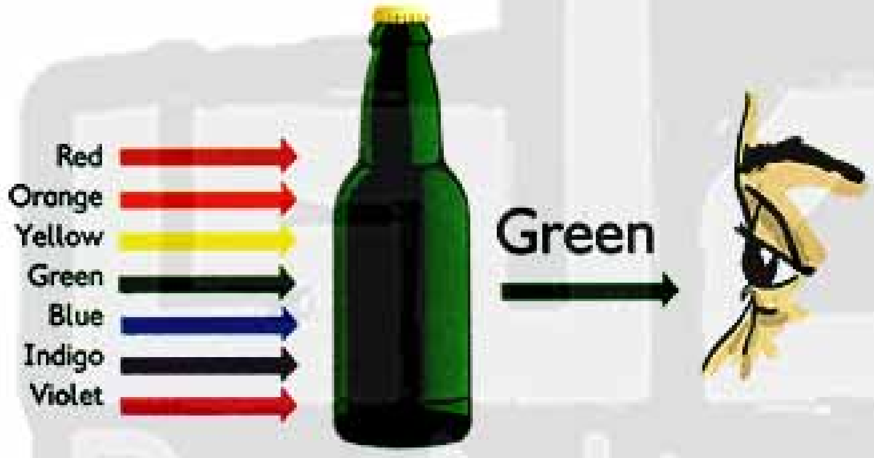
Why does the glass bottle appear to be green?



- To answer this question, read the following explanation.

Explanation:

1. When white light strikes the transparent glass bottle as shown, the glass bottle **absorbs** all the spectrum colors and allows (permits) the **green** light only to transmit through.



2. As a result, the glass bottle appears to be **green**.

Conclusion:

- Colored transparent and translucent objects have the same color of the light transmitted through.

2 Seeing colored opaque objects

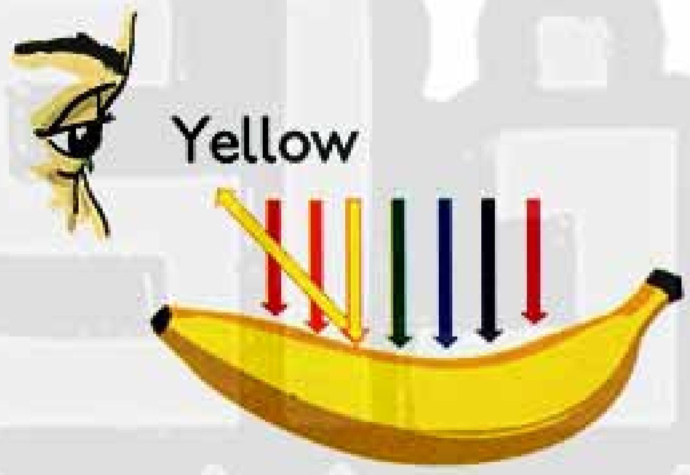
Why does the banana appear to be yellow?



- To answer this question, read the following explanation.

Explanation:

1. When white light strikes the banana (opaque object) as shown, the banana **absorbs** all the spectrum colors and reflects the yellow light only.



2. As a result, the banana appears to be yellow.

Conclusion:

- Colored opaque objects have the same color of the reflected light.

G.R.

1. **The yellow glass window appears yellow when white light falls on it.**
   Because it absorbs all the spectrum colors that fall on it and allows the yellow light only to transmit through.
2. **The strawberry appears red when white light falls on it.**
   Because it absorbs all the spectrum colors which fall on it and reflects the red light only.

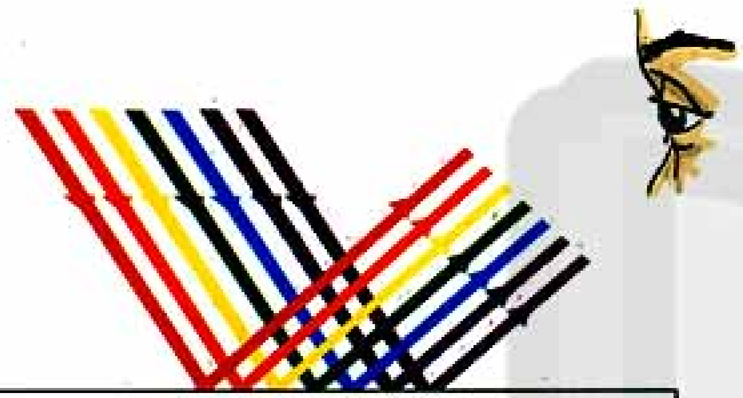
Try to solve Worksheet 3 Page 7

allow (permit)	يسمح	strike	يقع على	absorb	يمتص

Seeing white and black opaque objects

1 Seeing white opaque objects

- When white light strikes white opaque objects.
- Objects reflect all the spectrum colors.



A white surface

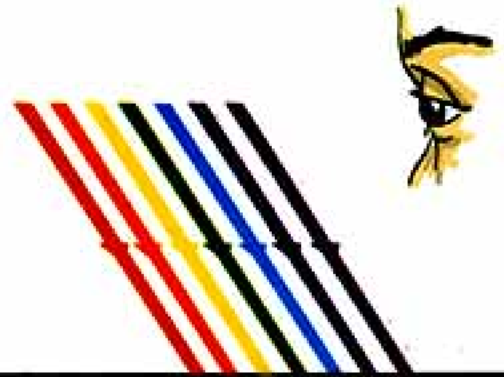
Result:

White opaque objects appear to be white. G.R.

Because they **reflect** all light colors.

2 Seeing black opaque objects

- When white light strikes black opaque objects.
- Objects absorb all the spectrum colors and do not reflect any color.



A black surface

Result:

Black opaque objects appear to be black. G.R.

Because they **absorb** all light colors.

G.R.

1. **We wear white clothes in summer.**
   Because white clothes reflect all light colors falling on them to decrease the feeling of heat.
2. **We wear black (dark) clothes in winter.**
   Because black clothes absorb all light colors falling on them to increase the feeling of warmth.

Checkpoint:

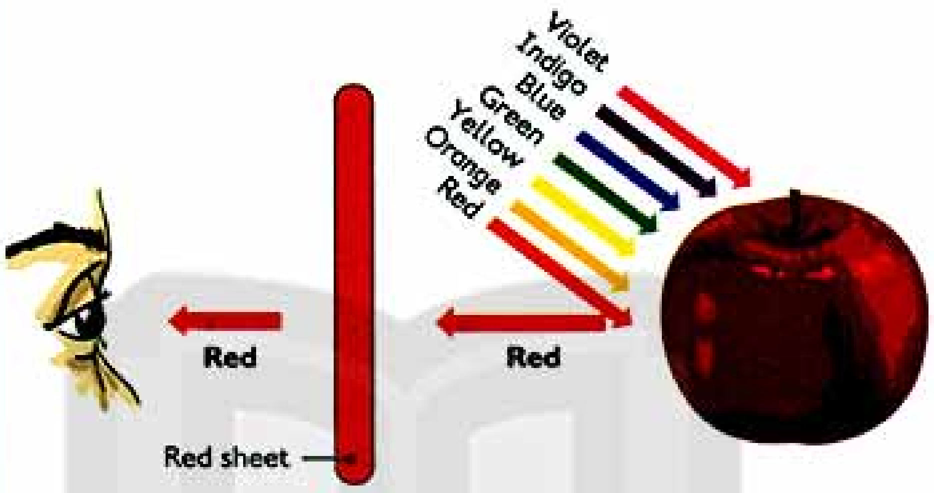
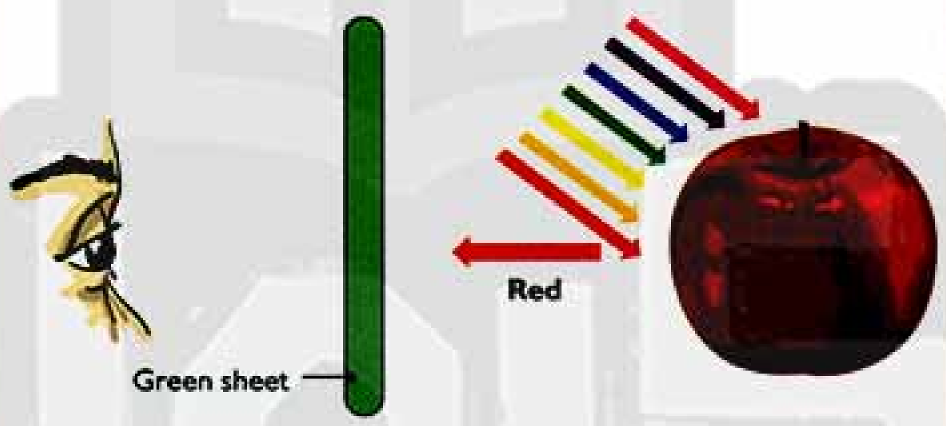
Complete the following sentences:

1. The black opaque object appears .... , because it .... all light colors.
2. The white opaque object appears .... , because it .... all light colors.

reflect	يعكس	absorb	يمتص	sheet of paper	فرخ ورق
wear	يرتدى	falling	الساقط	decrease	يقلل
feeling of heat	الشعور بالحر	increase	تزيد	feeling of warmth	الشعور بالدفء

Activity Watching colored opaque objects through colored transparent objects:

Materials A red apple - red, green and blue transparent glass sheets.

Steps	Illustration	Observation
1. Look at the red apple through the red transparent glass sheet. 2. Record what you see.		The red apple appears **red** when you see it through the red transparent glass sheet.
3. Repeat the previous steps using the green or blue transparent glass sheets respectively.		The red apple appears with no color and seems to be **black** when you see it through the green or blue transparent glass sheets.

Explanation

1. The apple appears red through the red transparent glass sheet. G.R.

Because it absorbs all the spectrum colors of light that strike it and reflects the red color only. The reflected red color transmits through the red transparent glass sheet.

2. The apple appears black or (no color) through the green transparent glass sheet. G.R.

Because the reflected red color from the apple is absorbed by the green glass sheet.

Conclusion The opaque object is seen in its original color when you see it through a transparent object that has the same color.

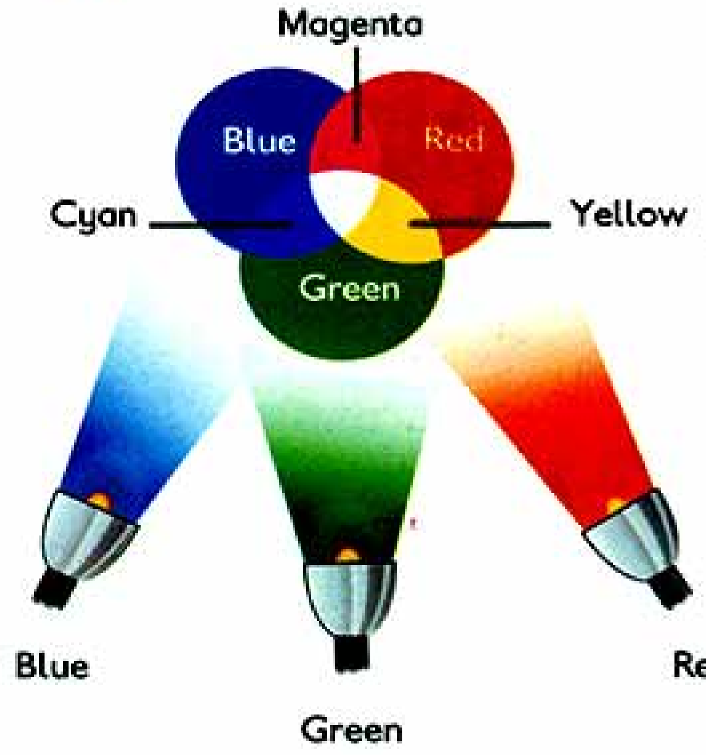
G.R. **The banana appears black when you look at it through a blue glass sheet.**

Because the reflected yellow color from the banana is absorbed by the blue glass sheet.

glass sheet	لوح زجاجي	record	سجِّل	repeat	كرِّر
seem	يبدو	respectively	على التوالي	original color	اللون الأصلي

Mixing the colored lights

▶ To identify the effect of mixing the colored lights, we use three colored projector sets which produce three circular light spots: red, green and blue as shown in the opposite figure.



▶ Colored light can be classified into:

1 Primary light colors

Definition

They are light colors that are not produced by mixing two other light colors.

Ex. Red, Green and Blue

Formation

- Impossible to be produced by mixing two other colored lights.

Red + Green + Blue ⟶ White

2 Secondary light colors

Definition

They are light colors which are produced by mixing two primary light colors.

Ex. Yellow, Magenta and Cyan

Formation

- Produced by mixing two primary colored lights together.

Yellow : formed by mixing (Red + Green)
Magenta : formed by mixing (Red + Blue)
Cyan : formed by mixing (Blue + Green)

NOTE Mixing colored dyes gives colors which are different from the colors resulting from mixing spectrum colors.

Do you know?
The cyan color is a light blue color.
The magenta color is a light purple color.

(Guide Answers: P. 4)

produce ينتج	circular light spots بقع ضوء دائرية	dyes أصباغ
projector set أداة لتسليط الصورة على الشاشة	primary light colors ألوان الضوء الأساسية	secondary light colors ألوان الضوء الثانوية

Benchmark

Selected from Previous Exams

1 Complete the following:

1. On mixing all seven spectrum colors, the .... is produced. *(Cairo 2016 / Giza 2017)*
2. Red light + green light + blue light = ... *(Qalubia 2016)*
3. As the light falls on the green grass, the grass absorbs all colors except .... *(Giza 2017)*

2 Write the scientific term:

1. The light colors that are impossible to be produced by mixing the two other colored lights. *(Qalubia Directorate L.S. 2016)* (..............................)
2. The light colors that are produced by mixing the primary colors. *(Cairo, Basateen 2016)* (..............................)

3 Give a reason for each of the following:

1. Green bottle appears green when white light falls on it. *(Alex, East Educational Zone 2016)*

....

2. Banana fruit seems yellow. *(Giza 2017)*

....

4 What happens when...?

1. Sunlight falls on a black object. *(Sharkia Directorate 2016)*

....

2. Mixing green and blue lights. *(Cairo, 2016 / Cairo 2017)*

....

3. You look at a red apple through a green glass sheet. *(Cairo, E.L.S. 2016)*

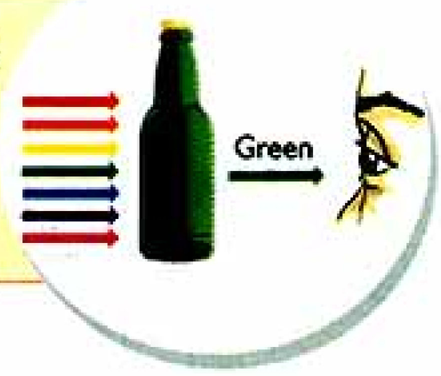
....

Try to solve Worksheet 4 Page 9

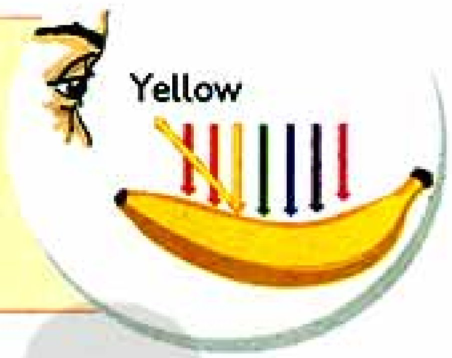
Brief

▶ We can classify the process of seeing colored objects into:

1 **Seeing colored transparent and translucent objects:**
The colored transparent and translucent objects have the same color of the light transmitted through.



2 **Seeing colored opaque objects:**
The colored opaque objects have the same color of the reflected light.



Seeing white and black opaque objects:

White opaque objects
- The white opaque objects reflect all the spectrum colors.

Black opaque objects
- The black opaque objects absorb all spectrum colors.

▶ Colored lights can be classified into:

Primary light colors

- They are light colors that are not produced by mixing two other light colors such as:

Red + Green + Blue ⟶ White

Secondary light colors

- They are light colors which are produced by mixing two primary light colors.

Red + Green ⟶ Yellow
Red + Blue ⟶ Magenta
Blue + Green ⟶ Cyan

Exercises on Lesson 2

Guide Answers P. 4

Solve Ex.

1 Choose the correct answer:

1. Mixing all the spectrum colors together produces .... light. *(Experimental L.S. 2015)*
   a. white b. yellow c. black d. red
2. The strawberry seems red because it .... the red color only. *(Dakahlia 2017)*
   a. refracts b. absorbs c. transmits d. reflects
3. The yellow glass .... the yellow color. *(Cairo 2017)*
   a. reflects b. transmits c. refracts d. absorbs
4. A black opaque object .... all the spectrum colors.
   a. refracts b. transmits c. absorbs d. reflects
5. The yellow banana seems to be .... when you look at it through a transparent green glass sheet. *(El-Nozha 2016)*
   a. red b. black c. yellow d. green
6. As light falls on a banana, the banana absorbs all colors except the .... one.
   a. red b. yellow c. black d. green
7. All the following are primary light colors except .... *(Cairo 2016 / 2017)*
   a. yellow b. green c. red d. blue
8. Mixing all the primary light colors together gives the .... light color.
   a. black b. cyan c. yellow d. white
9. Mixing the .... and blue lights gives the cyan light color.
   a. green b. magenta c. yellow d. red
10. Mixing blue light with red light produces .... *(Cairo 2015)*
    a. cyan b. yellow c. magenta d. violet
11. Among the examples of primary light is .... *(Giza 2017)*
    a. green b. magenta c. violet d. yellow

2 Complete the following sentences:

1. White light consists of .... colors, which are called .... *(Giza 2017)*
2. A prism separates sunlight into ....
3. On mixing all of the seven spectrum colors, the .... is produced. *(G.L.S. 2016)*
4. When white light strikes a transparent green object, this object absorbs all the spectrum colors and allows the .... light only to transmit through.
5. Colored transparent and translucent objects have the same color of the .... through.

6. .... objects have the same color of light which they reflect. *(Gharbia 2016 / Assuit 2017)*
7. Colored opaque objects have the same color of .... light.
8. The strawberry fruit seems red because it reflects the .... color only.
9. When white light strikes a banana, the banana absorbs all the spectrum colors and reflects the .... light only.
10. When white light strikes a black opaque object, this object .... all the spectrum colors and does not .... any color. *(Alex 2016)*
11. As the light falls on green grass, the grass absorbs .... except the .... *(El Zeitoun 2016)*
12. If the red light strikes a white ball, the ball looks .... *(Giza 2016)*
13. Red, green, blue are the .... light colors. *(El-Nozha 2016)*
14. Red light + green light + blue light = ... *(Qalubia 2016/ Luxor 2015)*
15. .... , ... and .... colors are known as secondary light colors.
16. Mixing the green and blue lights gives the .... light color. *(Alex E.L.S. 2012)*
17. Mixing the .... and .... lights gives the magenta light color. *(Cairo 2017)*
18. Mixing the .... and .... lights gives the yellow light color. *(El-Nozha, Manar House 2015)*
19. Mixing all the primary colored lights together gives ....

3 Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. When white light strikes a red rose, it reflects the white color. ( )
2. An object seems white since it reflects all the colors which white light is made up of. ( )
3. If you look at a yellow banana through a green glass sheet, it seems black. ( )
4. Transparent objects have the same color of the light that transmits through. ( )
5. A green table reflects all the light colors. ( )
6. When you look at a black body through a glass plate, the body and the plate appear in the same color. ( )
7. Yellow, purple and light blue (cyan) are primary light colors. *(St. Joseph 2016)* ( )
8. Yellow, purple and light blue (cyan) are secondary light colors. ( )
9. Red, green and blue are primary light colors. ( )
10. Mixing the red color with the green color gives cyan. *(Giza Edu. 2016)* ( )
11. We get a primary light color by mixing two secondary light colors. ( )
12. White is a primary color. *(G.L.S. 2016)* ( )

4 Write the scientific term for each of the following sentences:

1. The light that results from mixing the seven spectrum colors.
   (Giza 2017) (..............................)
2. The seven colors of light which sunlight is made up of.
   (Cairo 2015) (..............................)
3. The object that absorbs all the light spectrum colors and allows its own color only to transmit through. (..............................)
4. Objects that can be seen with the color of their reflected lights. (..............................)
5. The object that reflects all the spectrum colors falling on.
   (Cairo 2015) (..............................)
6. The object that absorbs all the spectrum colors falling on. (..............................)
7. The red, green and blue lights. *(Cairo, Helwan 2015)* (..............................)
8. The light colors that are impossible to be produced by mixing the two other colored lights. *(Qalubia 2016)* (..............................)
9. The colored light that is produced by mixing the green and blue lights. (..............................)
10. The colored light that is produced by mixing the red and blue lights. (..............................)
11. The light that is produced by mixing red, blue and green lights together. (..............................)
12. The yellow, cyan and magenta colors. (..............................)
13. The light colors which are produced by mixing two primary light colors. *(Sinai 2015 / Giza 2017)* (..............................)

5 Choose from column (B) what suits in column (A):

(A)	(B)
1. Yellow	a. is produced by mixing the red and blue lights.
2. Red	b. is produced by mixing the red and green lights.
3. Cyan	c. is produced by mixing the green and blue lights.
4. Magenta	d. is produced by mixing the primary light colors.
5. White	e. is known as a primary light color.
	f. is produced by mixing the secondary light colors.

1. .... 2. .... 3. .... 4. .... 5. ....

6 Give a reason for each of the following:

1. Transparent and semi-transparent bodies appear colored with the light that passes through.
   ....

2. Green bottle appears green when white light falls on it. *(Alex 2016)*

....

3. An apple appears red when sunlight falls on it.

....

4. We see a white board as it is, while a black board appears black.

....

5. 📖 It is preferred to wear black clothes in winter. *(Giza 2017)*

....

6. We must wear white clothes in summer. *(Rod El-Farag 2016)*

....

7. A red apple appears black through a green transparent glass sheet.

....

8. A banana seems yellow when you look at it through a yellow glass sheet. *(Cairo 2016)*

....

9. Yellow is known as a secondary light color.

....

10. Red is known as a primary light color.

....

7 What happens in the following cases?

1. Sunlight passes through a glass prism.

....

2. 📖 Mixing the seven spectrum colors. *(Giza 2017*

....

3. Sunlight falls on a black object. *(Sharkia 2016/ Ismailia 2012)*

....

4. Red light strikes a black surface.

....

5. White light falls on a green glass window.

....

6. Sunlight strikes a transparent blue bottle.

....

7. You look at a red apple through a green glass sheet. *(E.L.S, El-Sayeda 2016)*

....

8. Mixing the primary light colors. *(Ismailia, Mannal L.S. 2012)*

....

9. Mixing the red and blue lights. *(Cairo 2016, 2017)*

....

10. Mixing the red and green lights. *(Rod El-Farag 2016 / Giza 2015)*

....

11. Green light strikes a white ball.

....

8 What is meant by...?

1. Primary light colors. ....
2. Secondary light colors. ....

9 Compare between...:

A.

White opaque objects	Black opaque objects
....	....
....	....

B. *(Cairo 2015)*

Primary light colors	Secondary light colors
....	....
....	....

10 Look at the opposite figure and then answer:



1. What happens when you rotate this disc quickly?

....

2. What is your conclusion?

....

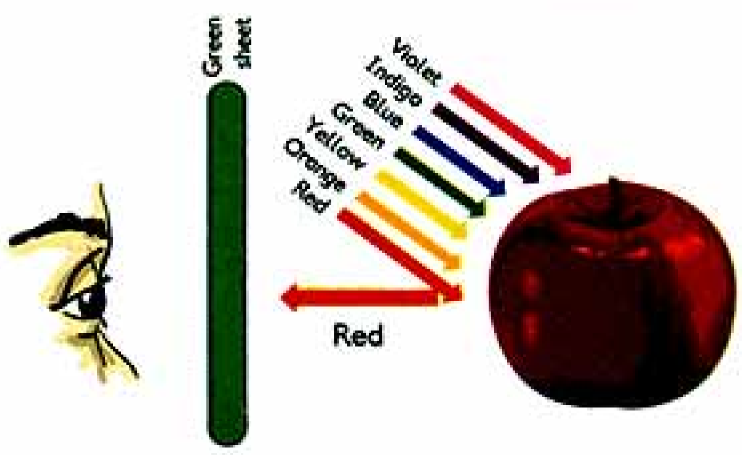
11 Look at the opposite figure and then answer:



1. The T-shirt appears in a .... color, while the shorts appears in a .... color.
2. What is your conclusion?

12 Look at the opposite figure and then complete: *(Cairo 2015)*

1. The apple appears to be .... behind the glass sheet.
2. What happens when we replace the green sheet with a red one?
3. The light colors falling on the apple are called ....

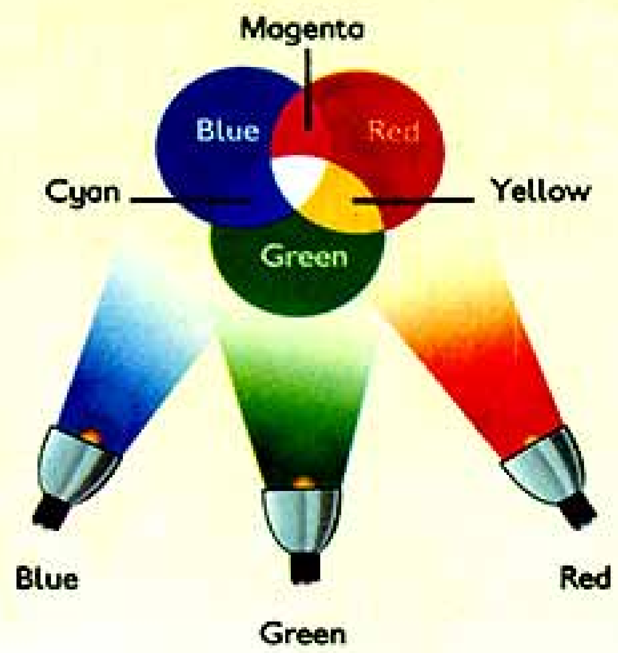


TIMSS Like questions on Lesson 2

Guide Answers P. 5

1 **The following diagram shows what happens when different colors of light combine.**

This is color combination.



a. What are the two colors that combine to give yellow light?

....

b. What are the two colors that combine to give cyan light?

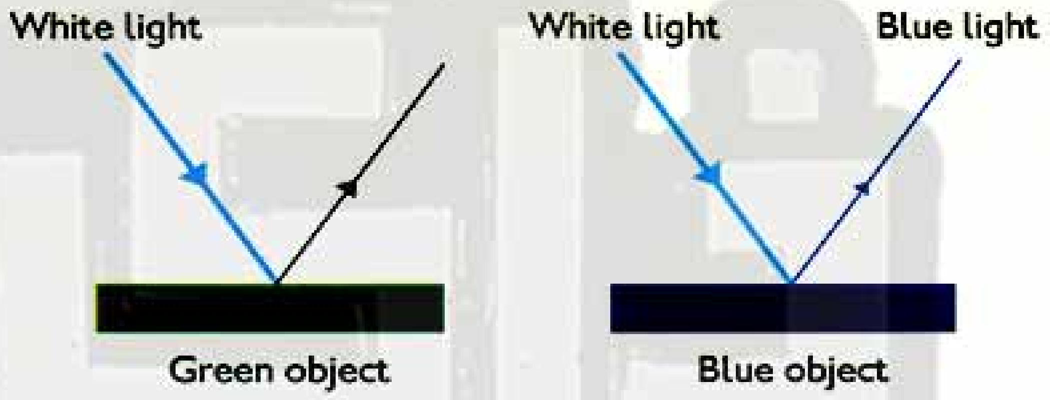
....

c. What are the two colors that combine to give magenta light?

....

2 The opposite diagram shows what happens when white light falls on a blue object. Blue light is reflected.

What colors of light are absorbed when white light falls on a green object?



....

....

3 Kamal puts on a pair of special glasses as shown in the opposite figure. The glasses have colored filters in them.

Kamal looks at a lamp through the green filter. The lamp gives out white light, but appears to be green. Explain how this is possible.



....

....



LESSON 3

Magnetism

- When iron nails fall in the sawdust, the carpenter must use a magnet to find them.
- A magnet has an effect on the surrounding area and this effect appears in the attraction of iron items like nails and clips.





What is Magnetism?

- **Look at the following pictures to identify the importance of magnetism in our daily life.**





- Magnets are used in many applications such as:
  - Attraction of objects that contain iron or steel.
  - Loud speakers and disc drives of computers, etc.

Watch Video

magnetism	المغناطيسية	magnet	المغناطيس	iron	الحديد
steel	الصلب	applications	تطبيقات	importance	أهمية
attraction	انجذاب	loud speakers	مكبرات الصوت	disc (disk) drive	مشغل الأقراص

The magnet

1. The history of discovering the magnet:

- Ancient Greeks discovered magnetism as early as 2000 years ago.
- They found a type of black rocks located in an area named Magnesia.
- This type of rocks has a natural force to attract the materials made of iron.
- This force is called magnetism and the rock is called natural magnet.



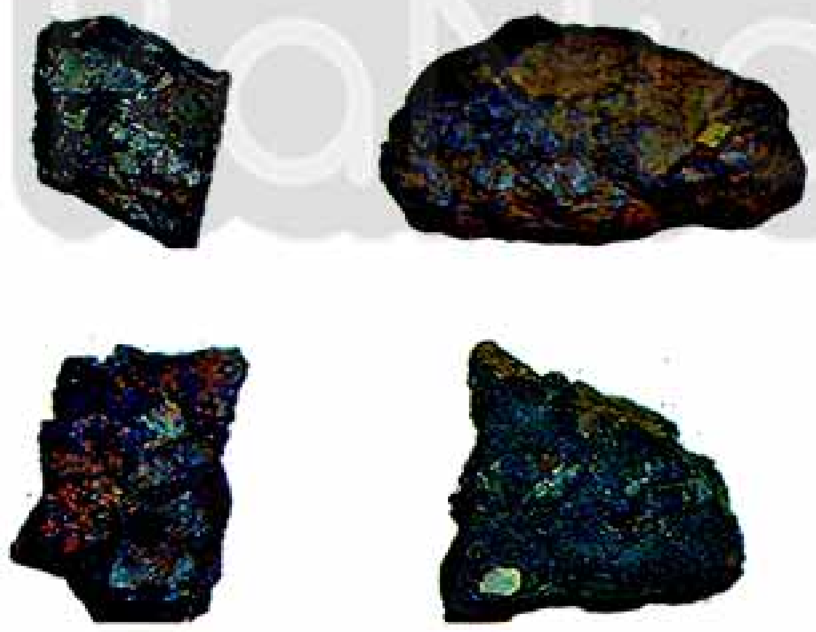
2. Types of the magnet:

- The magnet can be classified into two types:

1 The natural magnet (black rock)

- It is a black rock.
- It is one of the iron ores which is known as magnetite.

Shapes:

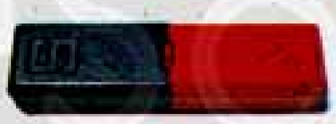


Magnetite

2 The artificial (man-made) magnet

- It is a magnet made by man.
- It has different shapes and sizes.

Shapes:



Bar



Ring (Round)



Horseshoe



Rectangular



Magnetic needle

discovering	اكتشاف	black rock	صخرة سوداء	natural force	قوة طبيعية
attract	تجذب	iron ores	خام الحديد	magnetite	الماغنتيت (اكسيد الحديد الأسود)
artificial	صناعى	shapes	أشكال	sizes	أحجام
horseshoe	حدوة الحصان	rectangular	مستطيلى الشكل	magnetic needle	إبرة مغناطيسية

Classifying materials according to their ability to be attracted (magnetization) into:

Magnetic materials	Non-magnetic materials
Materials which are attracted to the magnet.	Materials which are not attracted to the magnet.
Ex. iron – steel – cobalt – nickel.	Ex. paper – glass – wood – plastic – chalk – aluminum – copper.

Activity

To show the difference between magnetic materials and non-magnetic materials:

Materials A set of different objects such as (pins - nails - paper clips - pieces of glass - chalk pieces - an aluminum spoon - copper wire - a wooden pencil - plastic buttons) and a magnet.

Steps	Illustration	Observation
1 Put these objects on a table. 2 Approach the magnet to each object separately.		• Pins, nails and paper clips are attracted to the magnet. • Pieces of glass, chalk pieces, the aluminum spoon, the wooden pencil, plastic buttons and copper wire are not attracted to the magnet.

Conclusion

- The materials that are attracted to the magnet are called magnetic materials.
- The materials that are not attracted to the magnet are called non-magnetic materials.

G.R. **The magnet attracts iron nails, but does not attract chalk pieces.**
Because iron nails are magnetic materials, while chalk pieces are non-magnetic materials.

magnetization	المغنطة	magnetic materials	مواد مغناطيسية	non-magnetic materials	مــواد غيــر مغناطيسية
plastic buttons	أزرار بلاستيك	nails	مسامير	paper clips	دبابيس ورق
chalk	طباشير	approach	قرِّب	separately	على حدة

3. Properties of the magnet:

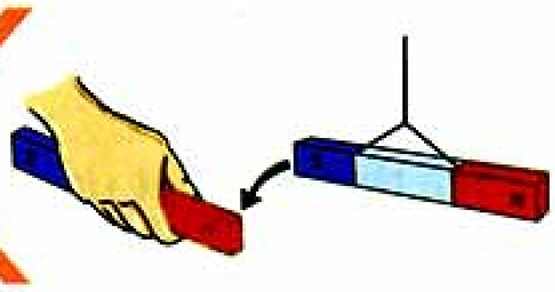
1. The magnet has two poles



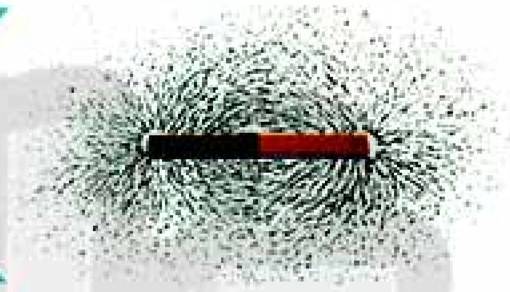
2. The freely suspended (free motion) magnet always takes a fixed direction (North-South direction).



3. Like magnetic poles repel each other, while unlike magnetic poles attract each other



4. The magnet is surrounded by an area called the magnetic field



1 The magnet has two poles.

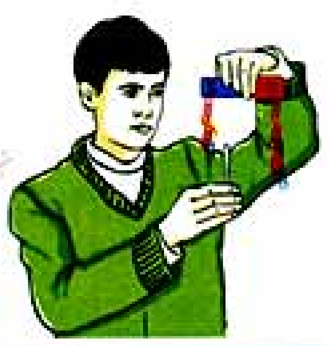
The magnetic poles (The two poles of the magnet)

- They are the areas of the magnet which have the most powerful force of attraction.

Activity To show that the magnet has two poles:

Watch Video

Materials A bar magnet - Metal paper clips.

Step	Illustration	Observation
Approach the bar magnet to the paper clips.		The two ends of the magnet attract a greater number of paper clips. G.R. Because the two poles of the magnet have the most powerful force of attraction.

Conclusion

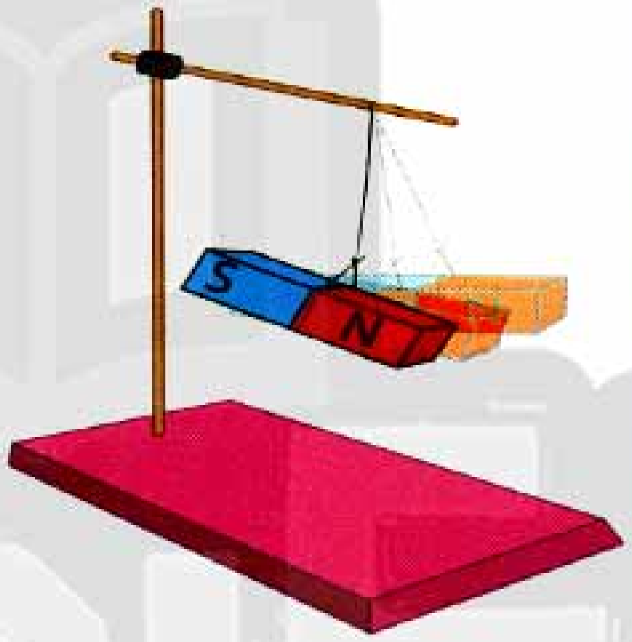
The areas of the magnet which have the most powerful force of attraction are the two ends which are called the two poles of the magnet.

poles	أقطاب	disappear	تختفى	magnetic force	القوة المغناطيسية

❷ The freely suspended magnet always takes a fixed direction.

Activity To show the direction of the free-motion magnet:

Materials A bar magnet - a wooden stand - a fine string.

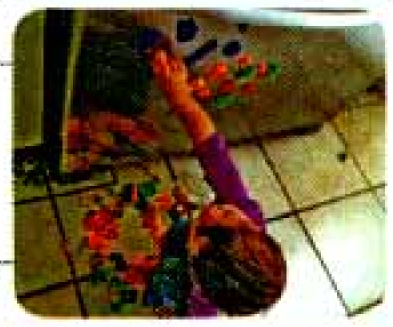
Steps	Illustration	Observation
① Hold a magnet at its center by a fine string. ② Fix the other end of the string in the stand. ③ Leave the magnet until it becomes horizontally stabilized. ④ Move the magnet to the right or to the left slightly, then leave it until it becomes stabilized. ⑤ Repeat the previous step several times and observe the direction of the magnet when it becomes stabilized.		One pole of the magnet is directed towards the north direction of the Earth, while the other pole is directed towards the south direction of the Earth.

Conclusion

1. The freely suspended magnet always takes a fixed direction which is "North-South" direction.
2. - Therefore, the pole of a magnet which points to the north direction is called north pole (N).
   - The pole of a magnet which points to the south direction is called south pole (S).

Do you know?
To differentiate between the two poles: The north pole is colored red. The south pole is colored blue.

Do you know?
- The magnet is used in making the doors of refrigerators and the small toys sticking on them.



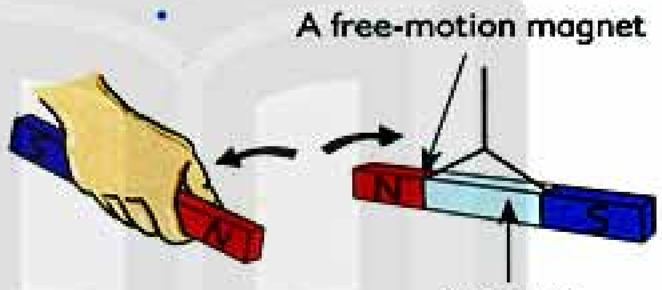
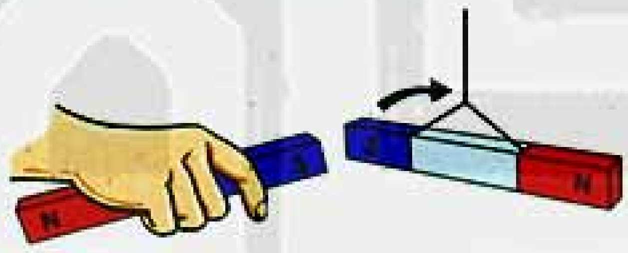
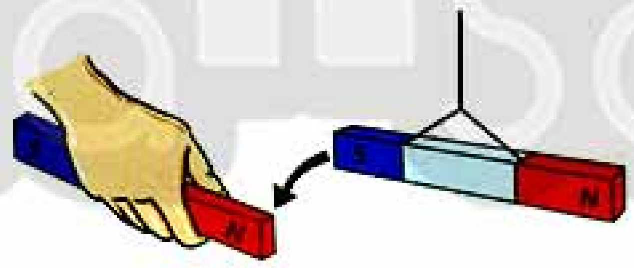
freely suspended	معلق بحرية	fixed direction	اتجاه ثابت	free-motion	حر الحركة
hold	امسك	fix	ثبت	the other end	الطرف الآخر
stand	حامل	horizontally	أفقيًا	stabilized	مستقر
slightly	قليلًا / طفيفًا	several times	مرات عديدة	differentiate	يميز/ يفرِّق

3 Like magnetic poles repel, while unlike magnetic poles attract.

Activity To prove that like magnetic poles repel each other, but unlike magnetic poles attract each other:

Watch Video

Materials Two bar magnets - a wooden stand - a fine string.

Steps	Illustration	Observation
1. Hang one magnet at its center by a fine string and let it move freely.	 Like poles repel.	
2. Approach the north pole of the other magnet to the north pole of the suspended one.		• The two north poles repel each other.
3. Repeat the previous step by approaching the two south poles to each other.	 Like poles repel.	• The two south poles repel each other.
4. Approach the north pole of the magnet to the south pole of the suspended one.	 Different (Unlike) poles attract.	• The north pole attracts the south pole and vice versa.

Conclusion
- Like (similar) magnetic poles repel each other.
- Unlike (different) magnetic poles attract each other.

G.R. **The south pole of a magnet attracts the north pole of another magnet but repels the south pole.**
Because unlike poles attract each other while like poles repel each other.

repel	تتنافر	like poles	أقطاب متشابهة	unlike poles	أقطاب غير متشابهة
attract	تتجاذب	hang	علّق	approaching	تقريب

Benchmark
Selected from Previous Exams

(Guide Answers: P. 6)

1 Complete the following:

1. Like poles .... and unlike poles .... (Cairo L.S. 2015 / Giza 2017)
2. Matter can be divided into .... and .... due to its magnetic ability. (Nour El Salam L.S 2016)
3. A natural magnet is a .... colored rock. (Cairo, Nasr City 2015)
4. The ancient Greek discovered the black rock in a region called .... (Giza 2017)

2 Write the scientific term:

1. A region of magnet where the magnetic force is maximum. (Nour El Salam L.S. 2016) (..........................)
2. The object that attracts magnetic substances. (Cairo 2017) (..........................)

3 What happens when...?

1. You leave a magnet to move freely. (Giza 2016)

....

2. Approaching the two south poles of a magnet to each other. (Cairo Experimental L.S. 2016)

....

4 Give a reason for each of the following:

1. Aluminum is a non-magnetic material. (Cairo 2017)

....

2. Iron is a magnetic material. (Cairo Experimental L.S 2015)

....

5 Choose the correct answer:

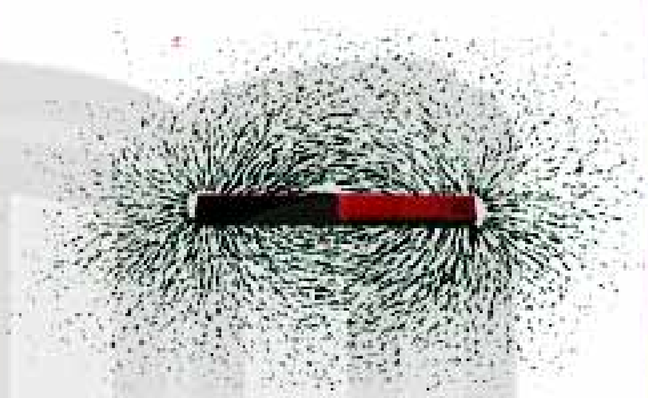
1. When a magnet is hung freely, its north pole points to the ....
   (north - east - south) (Cairo 2015)
2. The natural magnet was discovered .... years ago.
   (2000 - 3500 - 2500) (Sohag 2015)

Try to solve Worksheet 5 Page 11

4 The magnet is surrounded by an area called the magnetic field

Activity To illustrate the magnetic field of a magnet:

Materials Iron filings - a bar magnet - a glass sheet.

Steps	Illustration	Observation
1. Place the magnet horizontally on a table, then put the glass sheet on it. 2. Sprinkle (Spray) some iron filings on the glass sheet, and then hit it slightly.		Iron filings are arranged around the magnet in a regular shape. Or The two poles of the magnet are the areas where the biggest amount of iron filings are assembled.

Conclusion

- The magnetic field around the magnet has a regular shape.
- The magnetic force is concentrated at the two poles of the magnet and decreases gradually until it disappears in the middle.

The magnetic field	The magnetic force (magnetism)
It is a space region around a magnet where the effect of the magnetic force appears.	It is the ability of the magnet to attract magnetic materials that exist in its field.
Or	Or
The area around the magnet, where the magnet has an effect.	The force by which the magnet attracts magnetic materials.

G.R. The magnetic force is an invisible force.
Because we cannot see it, but we can feel its effect on iron filings.

Caution! A magnet loses its magnetic properties by heating or hammering.

magnetic field	المجال المغناطيسى	illustrate	يوضح	iron filings	برادة الحديد
place	ضع	sprinkle	رش	amount	كمية
effect	تأثير	assemble	تتجمع	region	منطقة
invisible force	قوة غير مرئية	heating	التسخين	hammering	الطرق

4. Uses of the magnet:

Historical background:

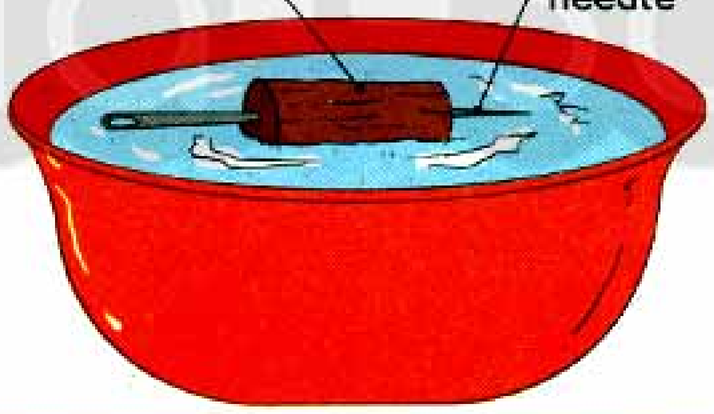


- Long time ago, the Chinese used the magnetic rock that spins freely taking a fixed direction which is North-South direction.
- Chinese Major General depended on this idea in leading his army through dense foggy areas.
- In 1600, William Gilbert (an English physician and physicist) used the same idea of the magnetic rock and made a magnetized needle (small and light magnet) that can spin freely.
- This magnetized needle was the idea of making the compass.
- The magnet is used in making the magnetic compass.

1. The structure of the compass	2. The use of the compass
• A small (light) magnetic needle spins freely around a fixed axis.	• The compass is used to identify the four main geographical directions.

Activity: To make a model of a compass.

Materials A basin containing water - a piece of cork - a magnetic needle (a small light magnet).

Steps	Illustration	Observation
(1) Float the cork piece on water. (2) Insert the magnetic needle in the floating cork piece. (3) Move the piece of cork, then leave it to stabilize.		The piece of cork moves freely to be stabilized where the magnetic needle refers to the north and south directions of the Earth.

Conclusion The magnetic needle of the compass refers to the north and south directions of the Earth.

Try to solve Worksheet 6 Page 13

historical background	خلفية تاريخية	spin	يدور	Chinese Major General	القائد العسكرى الصينى
leading	قيادة	army	جيش	dense foggy	كثيفة الضباب
physician	طبيب	physicist	فيزيائى	magnetized needle	إبرة ممغنطة
compass	بوصلة	structure	هيكل/ بنية	use	استخدام
model	نموذج	cork	فلين	float	تطفو

Brief

- The natural magnet is a black rock and one of the iron ores which is known as magnetite.
- The materials are classified according to their ability to be attracted (magnetization) into:

Magnetic materials	Non-magnetic materials
They are the materials which are attracted to the magnet. Such as: iron - steel - cobalt - nickel.	They are the materials which are not attracted to the magnet. Such as: paper - glass - wood - chalk.

Properties of the magnet:

1. The magnet has two poles (North - South).
2. The freely suspended magnet always takes a fixed direction (North-South direction)
3. Like magnetic poles repel each other, while unlike magnetic poles attract each other.
4. The magnet is surrounded by an area called the magnetic field.
5. The most powerful magnetic force of a magnet appears at the two poles and disappears in the middle.

The magnetic poles: They are the areas of the magnet which have the most powerful force of attraction.

The magnetic field: It is a space region around a magnet in which the effect of the magnetic force appears.

The magnetic force: It is the ability of the magnet to attract magnetic materials that exist in its field.

The compass: It is a tool that is used to identify the four main geographical directions.

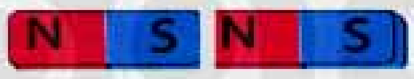
Exercises on Lesson 3

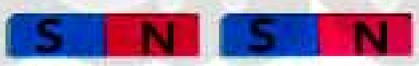
Guide Answers P. 6

Solve Ex.

1 Choose the correct answer:

1. The natural magnet was discovered more than .... years ago.
   a. 2000 b. 3500 c. 2050 d. 2100
2. The black rock is known as the ....
   a. magnetic field b. natural magnet c. magnetic force d. magnetic material
3. The material that is attracted to the magnet is called the ....
   a. magnetic field b. magnetic force
   c. magnetic compass d. magnetic material
4. All the following are from magnetic materials except ....
   a. iron b. steel c. wood d. cobalt
5. The material which is attracted to the magnet is .... *(Cairo 2017)*
   a. paper b. aluminum c. wood d. cobalt
6. When a magnet is hung freely, its north pole is directed towards the .... direction. *(G.L.S, El-Zeitoun 2016)*
   a. north b. south c. east d. west
7. All the following are among the properties of the magnet except ....
   a. it has two poles b. like magnetic poles repel each other
   c. unlike magnetic poles repel each other d. unlike magnetic poles attract each other
8. Which pair of bar magnets will repel each other, if placed close enough together? .... *(St. Joseph 2016)*
   a. 

   b. 

   c. 

   d. all the previous
9. The magnetic force of the magnet is concentrated at ....
   a. its two poles b. the south pole of the magnet only
   c. the north pole of the magnet only d. its middle
10. The magnetic force of the magnet disappears at ....
    a. its two poles b. the south pole of the magnet
    c. the north pole of the magnet d. its middle
11. To differentiate between the two poles of the magnet, ...
    a. the north pole is colored blue, but the south pole is colored red
    b. the north pole is colored red, but the south pole is colored blue
    c. the north pole is colored red, but the south pole is colored yellow
    d. the north pole is colored yellow, but the south pole is colored blue

12. 📖 When a magnet is hung freely, it takes the .... direction.
   a. north-west b. north-east c. north-south d. east-south
13. Magnet has .... poles. *(El-Zeitoun 2016)*
   a. no b. two c. one d. three
14. The .... is the ability of the magnet to attract the magnetic materials that exist in its field.
   a. magnetic field b. natural magnet c . magnetic force d. magnetic material
15. 📖 The compass contains a .... *(Giza 2017)*
   a. horseshoe magnet b. bar magnet
   c. small light magnetic needle d. ring magnet
16. The magnet force is the most powerful at ....
   a. its middle b. the two poles
   c. the north pole only d. the south pole only
17. Different magnetic poles .... each other. *(Gharbia 2016 / Cairo 2017)*
   a. repel b. attract c. intersect d. do not move far away
18. For a magnet, like poles ....
   a. repel b. attract c. intersect d. do not move far away

2 Complete the following sentences:

1. 📖 Ancient Greeks discovered black rocks in a region called .... and these rocks attract materials which are made of ....
2. The types of magnet are .... and ....
3. A natural magnet is one of the .... ores which is known as ....
4. An artificial magnet has different .... and ....
5. 📖 Materials can be divided into .... and .... due to their magnetic abilities.
6. .... and .... are considered magnetic materials. *(Rod El-Farag 2016)*
7. 📖 The magnet's pole that always refers to the north direction of the Earth is called ....
8. 📖 The magnet has the most powerful force of attraction at its ....
9. The magnet has .... poles which are .... and ....
10. The freely suspended magnet always takes a .... direction which is .... *(Giza 2016)*
11. 📖 Like poles .... each other whereas unlike poles .... each other. *(Cairo 2017)*
12. The north pole of a magnet .... the south pole of another magnet, but it .... the north pole.

13. 📖 The magnetic force is most powerful at the .... of the magnet. *(Assiut 2017)*
14. 📖 The .... is the space surrounding a magnet in which the magnetic force appears.
15. The magnetic force is the ability of the magnet to attract the .... materials that exist in its ....
16. The magnet is used in making .... that is used to identify the four main geographical directions.
17. In 1600, ... made a small-magnetized needle.
18. 📖 The .... consists of a small light magnet moving freely around a fixed axis.
19. The magnetic compass is used to identify ....
20. The north and south poles of a magnetic needle always point to .... and .... of the Earth. *(Giza 2016)*

3 Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. 2000 years ago, ancient Egyptians found Magnesia. ( )
2. The artificial magnet is a black rock. ( )
3. 📖 The natural magnet is one of the iron ores which is known as magnetite. ( )
4. 📖 A magnet attracts all materials. ( )
5. Magnetic materials are attracted to the magnet. ( )
6. Non-magnetic materials are attracted to the magnet. ( )
7. 📖 Aluminum is attracted to the magnet. *(El Zeitoun 2016 / Cairo 2015)* ( )
8. The magnet attracts copper wires, but does not attract metallic paper clips. ( )
9. 📖 The magnet has three poles. *(Giza 2016)* ( )
10. The freely suspended magnet always takes a fixed direction which is "East-West". ( )
11. 📖 Like magnetic poles repel each other, but unlike magnetic poles attract each other. ( )
12. 📖 The magnetic field is the space surrounding the magnet where the magnetic force appears. *(Sinai 2015)* ( )
13. When you approach a magnet to a small number of paper clips, the clips are attracted to the two poles of the magnet. ( )
14. Like poles attract each other whereas unlike poles repel each other. *(Cairo 2015)* ( )
15. The greatest magnetic force of the magnet is concentrated at its middle. ( )
16. The magnetic force is a visible force. ( )
17. The magnetized needle was the basic idea of making the compass. *(Alex 2016)* ( )

4 Write the scientific term for each of the following:

1. One of the iron ores which is known as magnetite. *(Rod El-Farag 2016)* (..............................)
2. 📖 The materials that are attracted to the magnet. *(Luxor 2015 / Cairo 2016)* (..............................)
3. 📖 The materials that are not attracted to the magnet. *(Cairo 2017)* (..............................)
4. 📖 The regions (two ends) of the magnet where the magnetic force is the most powerful. *(Menofia, Rod El-Farag 2016)* (..............................)
5. The region of the magnet where the magnetic force of the magnet disappears. *(El Zeitoun, Gharbia 2016)* (..............................)
6. 📖 The pole of the magnet which points to the north direction of the Earth. (..............................)
7. 📖 The space around a magnet in which the magnetic force appears. *(Gharbia 2016 / Giza 2017)* (..............................)
8. 📖 The pole of a magnet that is attracted to the north pole of another magnet. (..............................)
9. 📖 A set that is used for locating the four main geographical directions. *(Gharbia 2016 / Giza 2017)* (..............................)
10. 📖 An object that consists of a small light magnetic needle that can spin freely around a fixed axis. (..............................)
11. 📖 The force by which the magnet attracts some materials. *(Al-Agoza 2016)* (..............................)

5 Correct the underlined words:

1. Magnetite is <u>an artificial</u> magnet. (..............................)
2. The natural magnet is one of the iron ores known as <u>cobalt</u>. (..............................)
3. The materials that are attracted to the magnet are called <u>electric materials</u>. (..............................)
4. <u>Aluminum</u> gets attracted to the magnet. *(E.L.S 2016)* (..............................)
5. The magnetic force is concentrated at the <u>middle</u> of the magnet. *(El Nozha 2016)* (..............................)
6. The <u>lowest</u> magnetic force is concentrated at the two poles. (..............................)
7. <u>Dynamo</u> is used to identify the four main geographical directions. *(El-Zeitoun, Sayda 2016)* (..............................)

6 Choose from column (B) what suits in column (A):

(A)	(B)
1. The artificial magnet	a. is used to identify the four main geographical directions.
2. The magnetic field	b. is one of the iron ores which is known as magnetite.
3. The magnetic poles	c. is a man-made magnet.
4. The natural magnet	d. are the areas of the magnet which have the most powerful force of attraction.
5. The compass	e. is a region of space near a magnet where the effect of the magnetic force appears.

1. .... 2. .... 3. .... 4. .... 5. ....

7 Give a reason for each of the following:

1. Some materials are called magnetic materials. *(Cairo 2015/ Cairo 2017)*
   ....

2. Aluminum, copper and glass are considered non-magnetic materials.
   ....

3. The magnet attracts iron, but it does not attract copper. *(Assiut 2017)*
   ....

4. Copper is a non-magnetic material. *(Alex. E.L.S. 2012/ Giza-E.D. 2016)*
   ....

5. Steel and cobalt are attracted to the magnet. *(Luxor, Sinai 2015)*
   ....

6. Wood is a non-magnetic material. *(Dakahlia 2012/ Cairo 2015)*
   ....

7. When you approach a magnet to some paper clips, the clips are attracted to the two poles of the magnet. ....

8. The magnet attracts metallic paper clips, but does not attract aluminum wires.
   ....

9. The north pole of a magnet attracts the south pole of another magnet, but the north pole repels another north pole.
   ....

10. Using the compass by seamen during sailing. *(Qalubia 2012/ Cairo, Giza 2016)*
   ....

8 What happens if...?

1. You approach the horseshoe magnet to the following materials:
   Cobalt – wood – copper – steel.

   ....

2. You approach the horseshoe magnet to metallic paper clips and copper wires. *(Cairo, Gharbia 2016)*

   ....

3. A magnet is hung to move freely. *(Cairo 2015 / Assiut 2017)*

   ....

4. Fixing a magnetic needle on a piece of cork, then putting it in a basin containing water.

   ....

5. You approach the north pole of a magnet to the south pole of another magnet. *(Cairo 2016 - Giza 2017)*

   ....

6. You put the north pole of a magnet close to the north pole of another magnet.

   ....

7. Sprinkle some iron filings on a glass sheet which is put on a strong magnet, then knocking on the sheet slightly.

   ....

9 What is meant by...?

1. The natural magnet. ....
2. Magnetic materials. ....
3. Non-magnetic materials. ....
4. The magnetic poles. ....
5. The magnetic field. .... *(Cairo 2017)*
6. The magnetic force. ....

10 Give one difference between...:

1. Magnetic materials and non-magnetic materials. (Give examples) *(Sohag 2016 / Giza 2017)*

   ....

2. A natural magnet and an artificial magnet.

   ....

11 **What are the properties of a magnet?**

....

....

12 **Write a paragraph to illustrate the following:**

1. Hanging a magnet freely.

....

2. Placing two north poles of two magnets next to each other.

....

13 **Look at the following figure and then answer the questions:**



1. Regions (A), (B) and (C) represent ...., ..., ...
2. Which region has no effect on magnetic materials?

14 **Study the following figures, then write what happens in each case:**

(Ismailia, Manar L.S. 2012)



(a) (b) (c)

1. ....
2. From this activity we can know that like poles ...., and unlike poles ....

15 **Look at the opposite figure, then answer the following questions:**



1. The name of this figure is ....
2. It is used to ....
3. It consists of .... that can spin freely.

16 **Name the equipment that can be used in locating the four main directions.**

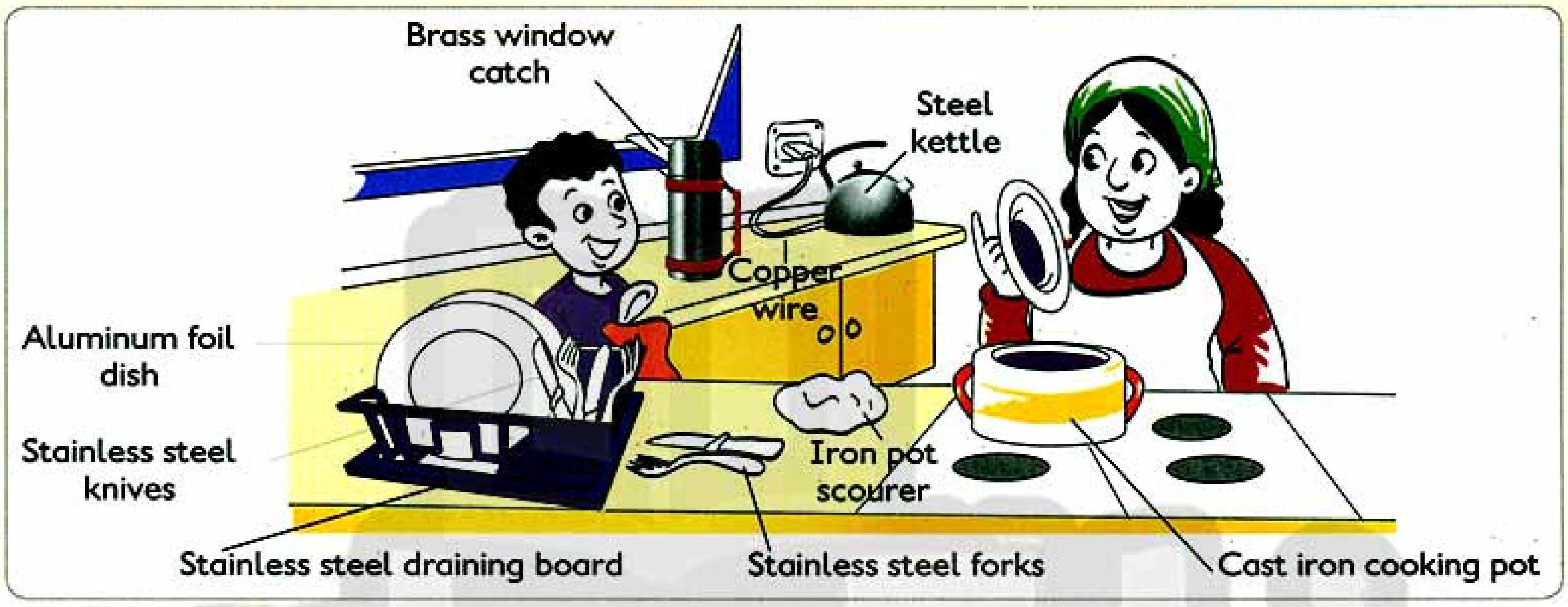
(Menofia, Rod El-Farag 2016)

....

TIMSS Like questions on Lesson 3

Guide Answers P. 8

1 Decide whether each metal shown in the picture is magnetic or non-magnetic.



Fill in your answers on this table.

Magnetic	Non-magetic
....	....
....	....
....	....

2 Asmaa's teacher gives her some pieces of metal to test. They have been wrapped up so that Asmaa cannot tell whether they are magnets or not.



Object **A** Object **B** Object **C** Object **D**

a. Asmaa brings objects A and B close together. The objects attract each other.
Asmaa writes: Objects A and B are both permanent magnets because they attract each other. Do you agree with Asmaa? Explain your answer.

....

b. Asmaa brings objects C and D together. The objects repel each other.
What can you say about objects C and D? Explain your answer.

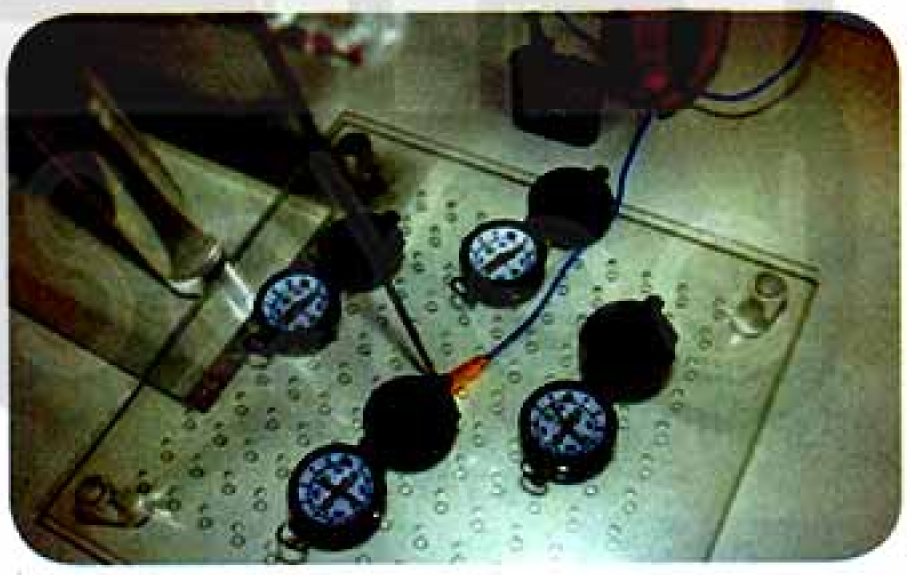


LESSON 4

Magnetism and electricity

In the 19th century, in 1820 Hans Christian Oersted found during his experiment that when an electric current flows in a wire, it moves a compass needle and this effect lasts as long as the current flows through the wire. This experiment established the relation between electricity and magnetism.

What is the relation between magnetism and electricity?



There are two relations:

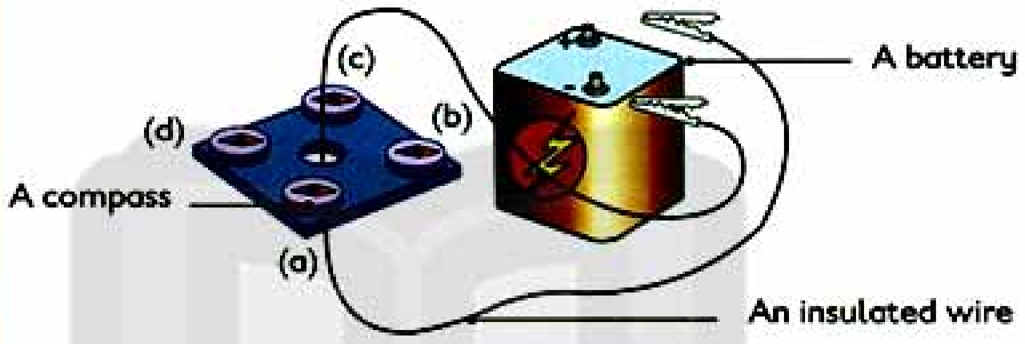
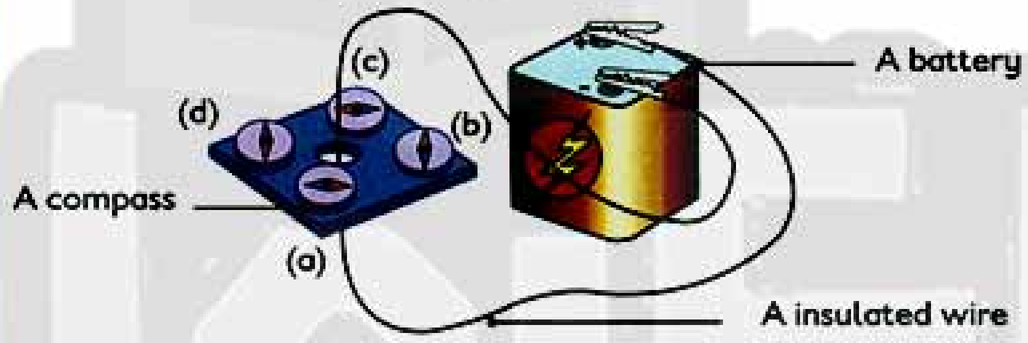
1. **The electric current can generate a magnetic field.**
2. **The magnetic energy can generate an electric current.**

magnetism	المغناطيسية	electricity	الكهرباء	identify	يحدد
relationship	علاقة	magnetic field	المجال المغناطيسى	electric flow	السريان الكهربى
electric current	التيار الكهربى	generate	يولِّد		

1. The magnetic effect of the electric current

Activity To show the magnetic effect of the electric current:

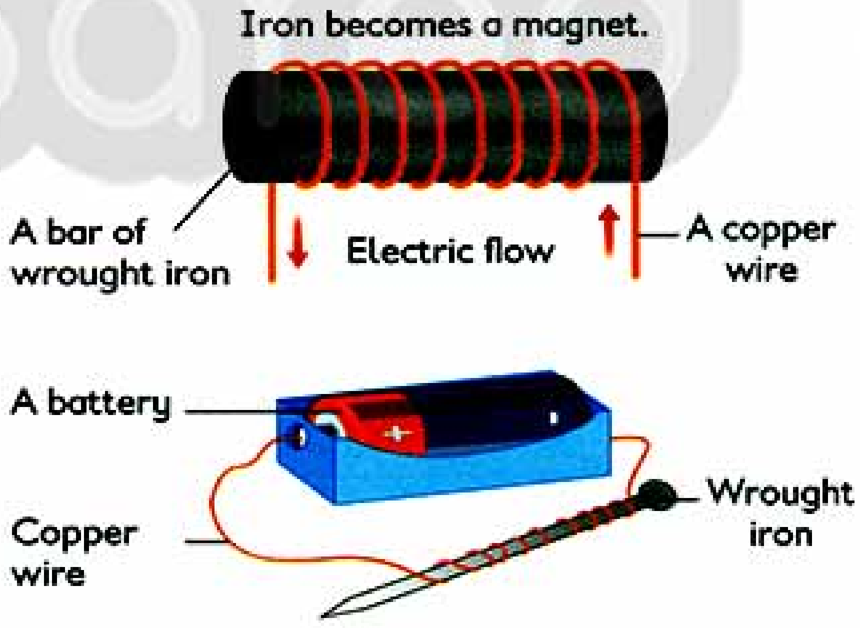
Materials A small compass - an insulated wire - a dry battery.

Steps	Illustration	Observation
① Put the insulated wire between the four different positions of the compass as in Fig 1.	Fig. (1)	• The compass needles are not deflected.
② Connect the wire ends with the two poles of the battery, then notice the compass needle in each of the four positions as in Fig 2.	Fig. (2)	• The compass needle deflects in the four positions only after flowing the electric current through the wire.

Conclusion • The electric current has a magnetic effect.

The electromagnet

▶ It is a temporary magnet which is made by the effect of electricity.



Electromagnet

1. The structure:

1. A bar of wrought iron.
2. A copper wire coiling around the bar of iron.
3. A dry cell (battery).

insulated wire	سلك معزول	compass needle	إبرة البوصلة	deflect	ينحرف
flowing	سريان	electromagnet	المغناطيس الكهربى	temporary	مؤقت
wrought iron	حديد مطاوع	coiling around	يلف حول	dry cell (battery)	بطارية جافة

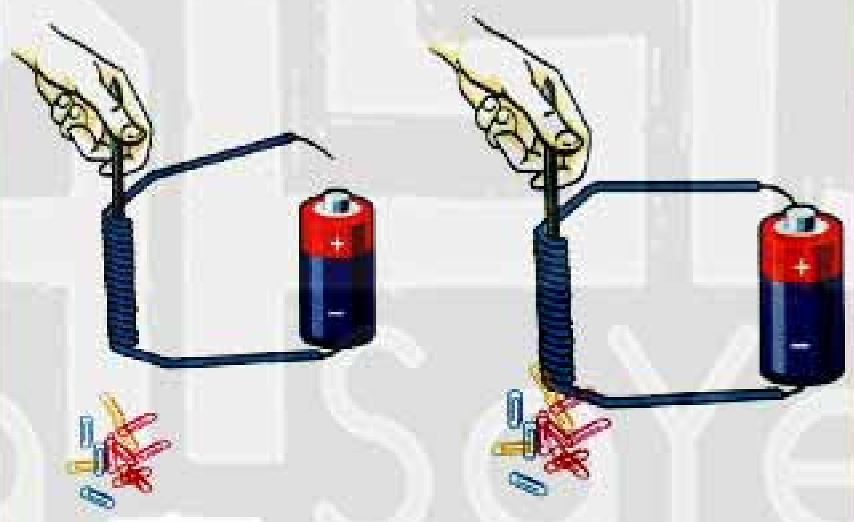
2. Idea of working:

1. When an electric current passes through the wire, the iron bar works as a magnet.
2. The electromagnet converts electric energy to magnetic energy.

Activity To show the idea of working of the electromagnet:

Watch Video

Materials 30 cm of an insulated copper wire - a long wrought (soft) iron nail - a dry battery - metal paper clips (or iron filings).

Steps	Illustration	Observation
1 Approach the iron nail to the metallic paper clips.		The iron nail does not attract the paper clips.
2 Wind the insulated copper wire around the wrought iron nail. 3 Remove the insulating material from the two ends of the insulated copper wire and connect them to the two poles of the battery to form an electric circuit. 4 Approach the iron nail to the paper clips.		The iron nail attracts the paper clips.

Conclusion

When an electric current passes through a coil winding around a wrought (soft) iron bar, the iron bar becomes a temporary magnet that is called the electromagnet.

N.B. The wrought (soft) iron nail gains and loses magnetism easily.

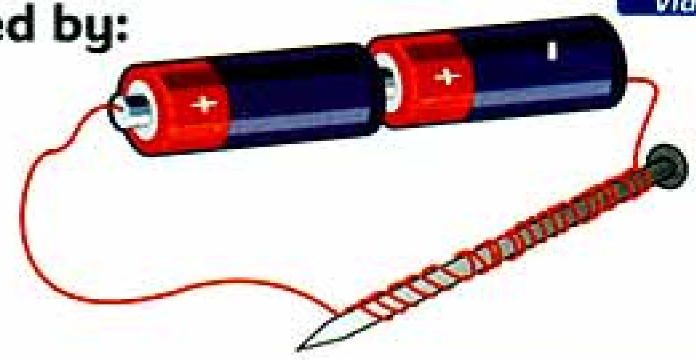
G.R. **A wrought iron nail is used for making the electromagnet.**
Because wrought iron nail loses and gains magnetism easliy.

convert	يحوِّل	wind	لف	connect	وصل
electric circuit	دائرة كهربية	coil	ملف	iron bar	ساق حديد

3. Increasing magnetic force of the electromagnet

The magnetic force of the electromagnet can be increased by:

- Increasing the number of coil turns.
- Or increasing the number of batteries, where the intensity of the electric current passing through the coil increases.



G.R. **The magnetic force of the electromagnet increases by increasing the number of batteries.**

Because the intensity of the electric current passing through the coil increases.

4. Uses of the electromagnet:

A. In factories:
to lift heavy iron blocks by using big-sized winch.

▶ It is used to make the big-sized winch (crane) that is used to lift heavy iron blocks in factories.


A crane

Where,

1. The electric current passes through the coil of the electromagnet, so it attracts the iron blocks, then moves to another place.
2. Cutting the electric current, so that the electromagnet loses its magnetic force and the iron blocks fall.

B. Making many devices such as:

Electric bell	Electric mixer	Disc drive	TV set
			

coil turns	لفات الملف	intensity	شدة	crane	رافعة كهربية
lift	يرفع	winch	ونش	iron blocks	كتل حديدية
electric bell	جرس كهربى	electric mixer	خلاط كهربى	disc drive	مشغل الأقراص

Benchmark

Selected from Previous Exams

(Guide Answers: P. 8)

1 Complete the following:

1. The electromagnet consists of .... , ... and .... *(Cairo, El-Zeitoun 2016)*
2. Electromagnet changes .... energy to .... energy. *(Sharkia 2016)*

2 Give a reason for: *(Gharbia L.S. 2016/ Cairo 2017)*

- The magnetic force of electromagnet increases by increasing the number of batteries.

....

3 What is the use or the importance of ...?

- Electromagnet. *(Cairo 2016/ Giza 2017)*

....

4 Put (✓) or (✗):

1. The electric current has a magnetic effect. (   ) *(Cairo 2017)*
2. The electromagnet consists of an iron bar and coil only. (   ) *(Alex 2015/ Giza 2017)*

5 What happens if?

- An electric current passes through a wire (coil) wound around a wrought iron bar. *(Cairo 2016)*

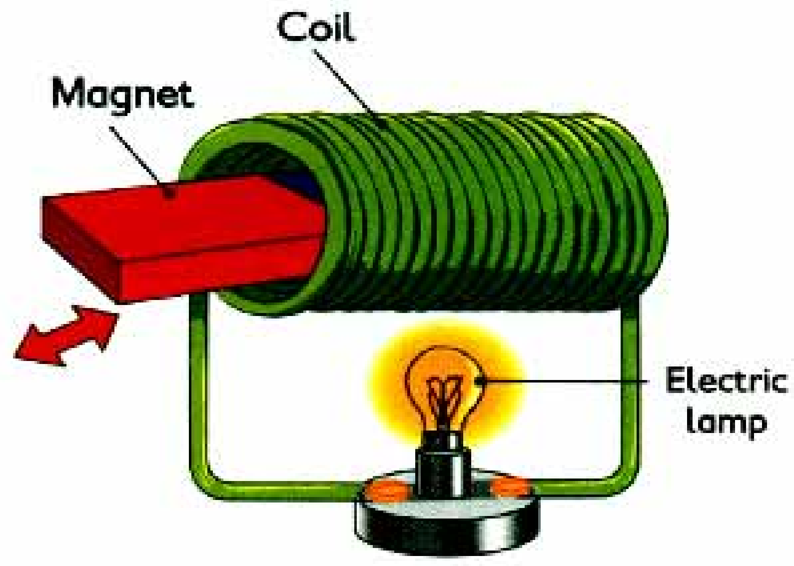
....

....

Try to solve Worksheet 7 Page 15

2. The electric effect of the magnet

- In the 19th century, the English scientist Faraday discovered that when a magnet is moved inside a coil of wire, an electric current passes through the coil.
- Faraday used that to make the dynamo "electric generator".



The dynamo (electric generator):

1. The structure:

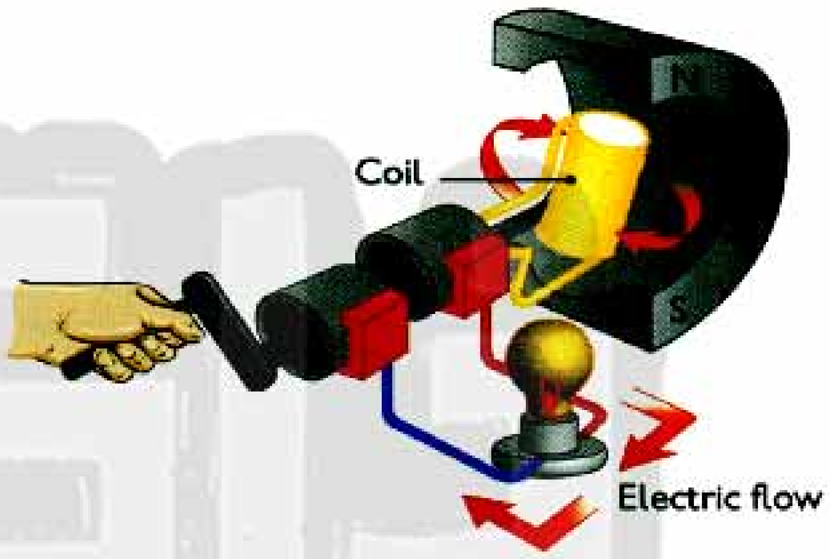
1. A copper coil.
2. A magnet.

2. Its function:

- It converts the mechanical (kinetic) energy into electric energy.

3. Idea of work:

- By moving the coil in the magnetic field (or moving the magnet inside the coil) the electric current is generated in the coil.



The electric generator (dynamo)

Increasing the produced amount of electricity from the dynamo by:

a. Using a strong magnet.
b. Or increasing the number of turns in the moving coil.

Checkpoint:

Mention the function of:

1. Electromagnet.
2. The dynamo.

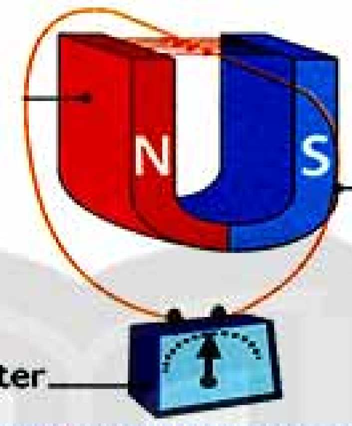
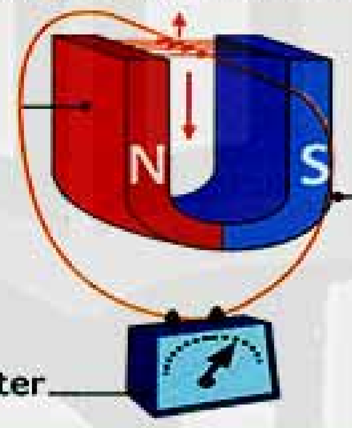
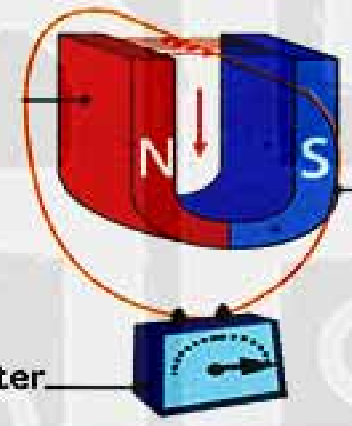
Write the scientific term for each of the following:

1. The device that is used to change the electric energy to magnetic energy. (..............................)
2. A device that is used to change the kinetic energy to electric energy. (..............................)
3. A device that is used to carry heavy metal blocks. (..............................)

discover	يكتشف	electric generator	مولد كهربى	electric power station	محطة توليد كهرباء
kinetic energy	طاقة حركة	dynamo	مولد	mechanical energy	طاقة ميكانيكية

Activity To show how the dynamo works:

Materials A U-shaped magnet (horseshoe) - a coil of copper wire - the ammeter (used to measure the electric current intensity).

<table>
<tr><th>Steps</th><th>Illustration</th><th>Observation</th></tr>
<tr><td>1. Connect copper wire with ammeter, then put it between the two poles of the magnet.</td><td>
</td><td>The pointer of the ammeter does not deflect.</td></tr>
<tr><td>2. Move the copper wire from up to down between the two poles of the magnet.</td><td>
</td><td>The pointer of the ammeter deflects due to the passing of the electric current in the wire.</td></tr>
<tr><td>3. Increase the motion of the wire between the two poles of the magnet.</td><td>
</td><td>The deflection of the pointer of the ammeter increases due to the passing of more electric current.</td></tr>
</table>

Conclusion

1. By moving the coil in the magnetic field (or moving the magnet inside the coil), the electric current is generated in the coil.
2. The dynamo (the electric generator) changes kinetic energy into electric energy.
3. The electric current increases by increasing the motion of the coil between the two poles of the magnet.

Ammeter

- It is a device used to measure electric current intensity.

current intensity	شدة التيار	pointer	مؤشر	deflect	ينحرف
motion	حركة	ammeter	جهاز لقياس شدة التيار	deflection of the pointer	انحراف المؤشر

Examples of the dynamo:

1 The small dynamo in a bicycle

Structure:

1. A small cylinder that touches the bicycle wheel tire.
2. The cylinder is connected to a U-shaped magnet that is surrounded by a coil.

Idea of work:

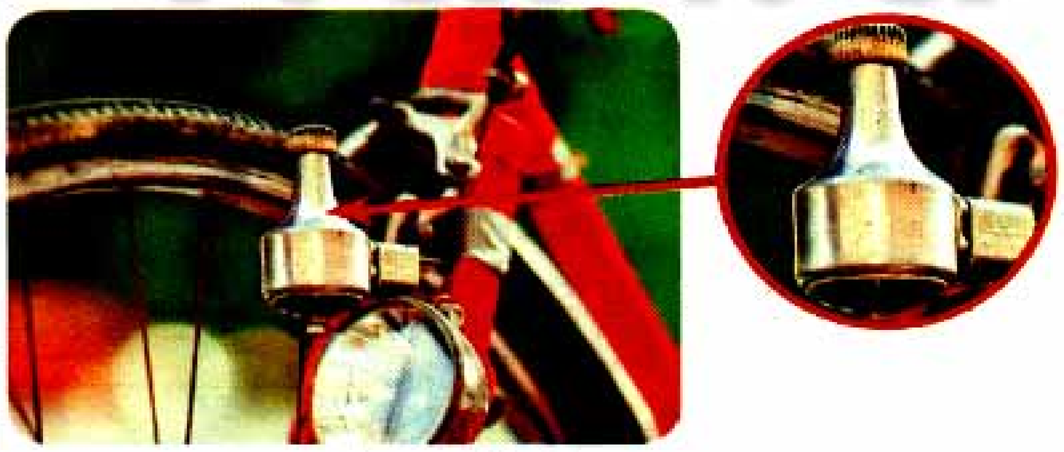
It converts the mechanical (kinetic) energy into electric energy.

Explanation:

When the bicycle moves, the small cylinder turns by touching a bicycle wheel tire, so the magnet turns inside the coil and the electric current is generated causing the lighting of the bicycle's bulb.

Uses:

A small dynamo generates a small amount of electricity to light the bicycle's bulb.



A small dynamo

2 The huge dynamo (electric generator)

Structure:

Many great coils that turn between the two poles of a huge magnet.

Idea of work:

It converts the mechanical (kinetic) energy into electric energy.



A huge dynamo

Uses:

A huge dynamo is used in electric power stations to generate a large amount of electricity for:

1. Lighting cities.
2. Operating factories.

cylinder	أسطوانة	wheel	عجلة	tire	إطار
light	يضىء / ينير	touching	تلامس	bulb	لمبة
electric power stations	محطات قوى كهربية	operating factories	تشغيل المصانع		

Life application

Types of electric power stations:

1 Wind electric power stations:

(The wind energy moves the dynamo).



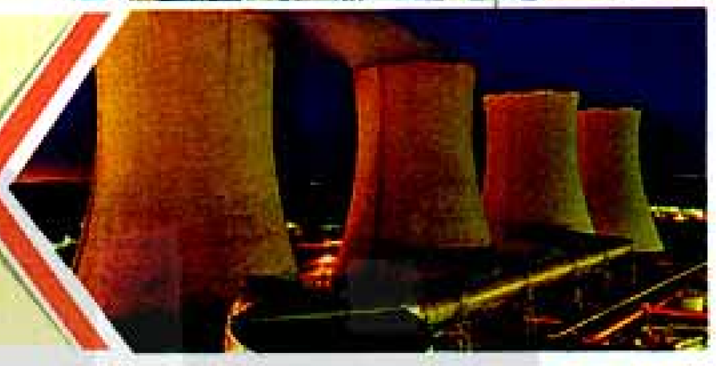
2 Thermal fuel electric power stations:

use heat energy that is produced from burning fuel (Heating water to produce steam which is used to move the dynamo).



3 Nuclear electric power stations:

(The heat energy that is produced from the nuclear reactors moves the dynamo).



	Electromagnet	Dynamo
Structure	1. A bar of wrought iron. 2. A copper wire coiling around the bar of iron. 3. A dry cell (battery).	1. A copper coil. 2. A magnet.
Increasing the force	1. Increasing the number of coil turns. 2. Increasing the number of batteries.	1. Using a strong magnet. 2. Increasing the number of turns in the coil.
Uses	1. In factories: It is used to make winches (cranes) which is used to lift heavy iron blocks. 2. Making many devices such as: a. The electric bell. b. The electric mixer. c. The disc drive. d. The television	1. A small dynamo is used in bicycle to generate a small amount of electricity to light the bicycle's bulb. 2. A huge dynamo is used in electric power stations to generate electricity for: a. Lighting cities. b. Operating factories.

Try to solve Worksheet 8 Page 17

wind	الرياح	thermal fuel	وقود حرارى	steam	بخار
nuclear reactors	المفاعلات النووية	move	يتحرك	lighting cities	إنارة المدن

Brief

1. The electric current has a magnetic effect.
2. The magnetic field has an electric effect.

The electromagnet:

It is the device that is used to convert electric energy into magnetic energy.

Its structure:

1. A bar of wrought iron.
2. A copper wire coiling around the bar of iron.
3. A dry cell (battery).

▶ **The magnetic force of the electromagnet can be increased by:**

1. Increasing the number of coil turns.
2. Increasing the number of batteries.

Ammeter

▶ It is a device used to measure electric current intensity.

The dynamo (the electric generator):

▶ It is a device that is used to convert the mechanical energy into electric energy.

▶ Its structure:

1. a copper coil
2. a magnet

▶ The produced amount of electricity from the dynamo can be increased by:

1. Using a strong magnet.
2. Increasing the number of turns in the moving coil.

Examples of the dynamo:

1. The small dynamo in a bicycle.
2. The huge dynamo (electric generator) in electric power stations.

Types of electric power stations:

1. Wind electric power stations.
2. Thermal fuel electric power stations.
3. Nuclear electric power stations.

Exercises on Lesson 4

Guide Answers P. 8

Solve Ex.

1 Choose the correct answer:

1. When the compass is put beside a wire carrying an electric current, ...
   a. no deflection occurs b. the compass needle is deflected
   c. the compass needle is destroyed d. no correct answer
2. When an electric current passes through a coil of wire twisted around a wrought iron bar, the wrought iron bar becomes a .... magnet.
   a. temporary b. permanent c. strong d. weak
3. The .... is the magnet which is made by electricity.
   a. natural magnet b. electromagnet
   c. magnetite d. no correct answer
4. The electromagnet loses its magnetism ....
   a. by increasing the intensity of electric current
   b. by increasing the number of coil turns
   c. by increasing the number of batteries
   d. by cutting the electric current
5. The magnetic force of the electromagnet increases ....
   a. by decreasing the intensity of the electric current
   b. by increasing the number of coil turns
   c. by decreasing the number of batteries
   d. by cutting the electric current
6. An electric current is generated in a coil of an insulated wire when you move a/an .... inside the coil.
   a. iron bar b. wooden bar c. bar magnet d. non-magnetic bar
7. .... is the scientist who invented the dynamo. *(El-Nozha, Rod El-Farag 2016)*
   a. William Gilbert b. Faraday c. Newton d. No correct answer
8. The apparatus that converts kinetic energy into electric energy is called ....
   a. battery b. dynamo c. electric generator d. (b) and (c)
9. The electric generator (dynamo) works on changing the ....
   a. kinetic energy into electric energy b. electric energy into mechanical energy
   c. magnetic energy into mechanical energy d. electric energy into magnetic energy
10. The electric current that is produced by the electric generator (dynamo) increases ....
    a. by using a strong magnet b. by increasing the number of coil turns
    c. by using a weak magnet d. (a) and (b)

11. The coil of a dynamo is made up of .... wires. *(Giza 2017)*
   a. carbon b. copper c. plastic d. graphite

12. The dynamo is fixed in the bicycle touching the bicycle's .... *(Cairo 2016 / Giza 2017)*
   a. seat b. pedal c. tire d. gear

13. All the following are among the uses of the electromagnet except .... *(Cairo 2016)*
   a. cranes in factories to move heavy iron blocks
   b. making electric bells
   c. making TV sets d. making electric lamps

14. The huge dynamo is used in ....
   a. lighting cities b. operating factories
   c. lighting the bicycle's bulb d. (a) and (b)

2 Complete the following sentences:

1. The electric current has a .... effect, while magnet has .... effect.
2. The magnet that is made by electric current is called ....
3. When an electric current flows through a wire twisted (winding) around a wrought iron nail, the nail becomes ....
4. The electromagnet consists of ...., ... and .... *(El-Zeitoun 2016)*
5. When the .... passes through a coil winding around a wrought iron bar, the bar works as a ....
6. The electromagnet loses its magnetism when ....
7. The electromagnet converts .... energy into .... energy. *(Giza 2016)*
8. The magnetic force of the electromagnet increases by increasing .... and ....
9. .... is used to pick up (move) huge blocks of iron. *(Alagoza 2016)*
10. When you move a coil between two poles of a magnet, ... is generated in the coil.
11. The electric energy can be generated by a ....
12. .... is the scientist who invented the dynamo.
13. The basic idea of the electric generator is the changing of .... energy into .... energy. *(Giza 2016 / Assiut 2017)*
14. In the dynamo, the .... energy moves the magnet to produce .... *(Dokki, Sayda 2016)*
15. The electric current produced by the electric generator (dynamo) increases by .... or .... *(Exp. L.S. 2016)*
16. The apparatus that converts kinetic energy into electric energy is called ....
17. There are many examples of the dynamo such as .... and ....
18. In electric power stations, ... is used to generate electricity.

3 Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. The electromagnet consists of an iron bar and a coil only. *(Cairo 2016 / Giza 2017)* (   )
2. We must increase the number of coil turns in the electromagnet. (   )
3. The electric current can be generated by using a magnet. (   )
4. The electric current has a magnetic effect. *(Cairo 2017)* (   )
5. An electromagnet is formed when an electric current passes through a compass. (   )
6. The basic idea of the electric generator is the changing of the electric energy into kinetic energy. (   )
7. The electromagnet loses its power when cutting the electric current. *(Giza 2017)* (   )
8. The deflection of the ammeter's pointer increases by increasing the motion of the coil. (   )
9. Magnetism is always related to electricity. (   )
10. Coil of dynamo is made up of aluminum. (   )
11. Electric bell and electric mixer contain dynamo. *(Cairo 2017)* (   )
12. Dynamo converts kinetic energy into heat energy. *(Cairo 2017)* (   )
13. Electricity can be produced from magnetism and vice versa. (   )

4 Write the scientific term for each of the following:

1. The magnet which is made by electricity. (..................)
2. The device that is used to change electric energy into magnetic energy. *(Alagoza 2016/ Giza 2017)* (..................)
3. The set that is used to change the mechanical energy into electric energy. *(Cairo 2015, 2016)* (..................)
4. The device that is composed of a copper wire and a magnet. (..................)
5. The device that is used for lifting several tons of steel and scrap cars. (..................)
6. The dynamo that contains a huge magnet. (..................)
7. The set that is used in the bicycle to light its bulb. (..................)
8. The device that is used to measure the electric current intensity. (..................)
9. The type of iron that is used in making electromagnets. (..................)

5 Choose from column (B) what suits in column (A):

(A)	(B)
1. The dynamo	a. is used to measure the electric current intensity.
2. The ammeter	b. is used in lighting cities.
3. The huge dynamo	c. increases by increasing the number of coil turns.
4. The big-sized winch (crane)	d. is used to change the mechanical energy into electric energy.
5. The magnetic force	e. is used for lifting several tons of steel and scrap cars.

1. .... 2. .... 3. .... 4. .... 5. ....

6 Give a reason for each of the following:

1. A magnet which is made by electricity is called a temporary magnet.
   ....
2. The magnetic force of electromagnet increases by increasing the number of batteries. *(Gharbia 2016)*
   ....
3. The deviation of the ammeter's pointer when moving the copper wire between the two poles of a magnet.
   ....
4. The electromagnet is used in lifting heavy iron blocks.
   ....
5. The electromagnet has great importance.
   ....
6. The dynamo changes the mechanical energy into electric energy.
   ....
7. In the dynamo, we must increase the motion of the coil between the two poles of the magnet.
   .... *(Cairo 2017)*

7 What happens if...?

1. Electric current passes through a wire twisted around a wrought iron.
   ....
2. We move a magnet inside a coil of wire. *(Sohag 2016)*
   ....
3. Moving a wire up and down between the two poles of a magnet. *(Giza 2017)*
   ....

8 What is meant by...?

1. The electromagnet. ....
2. The dynamo. ....
3. The huge dynamo. ....

9 Draw a labeled diagram to show the following:

1. Using a coil of wire, a battery and a wrought iron nail to make an electromagnet.
2. Using a coil of wire and a magnet to generate an electric current.

① ②

10 **Compare between** the electromagnet and the dynamo according to the scientific idea and structure. *(Qalubia 2016, 2017)*

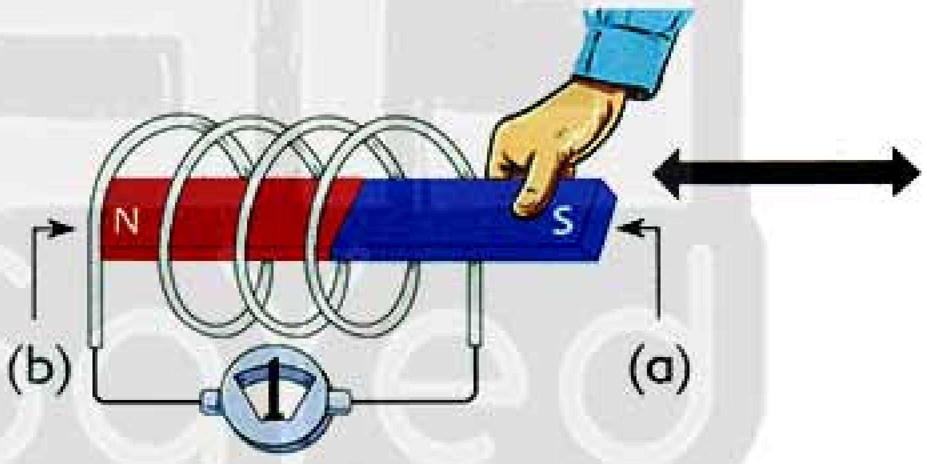
P.O.C.	Electromagnet	Dynamo
Scientific idea	....	....
Structure	....	....

11 **Mention one use for each of the following:**

1. The electromagnet. *(Qalubia 2017 / Cairo 2015)*
   ....
2. The huge dynamo. *(Qalubia 2017)*
   ....
3. Cranes (winches).
   ....
4. Dynamo. *(Cairo 2016)*
   ....

12 **Look at the opposite figure, then complete the following:** *(Sohag 2016, Cairo 2017)*

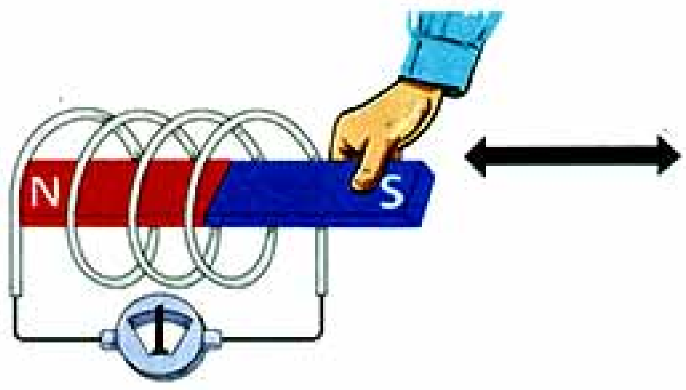
1. Part (a) is .... , but part (b) is ....
2. When part (a) is moved inside part (b), ... is generated in part (b).
3. This means that .... energy can be changed into .... energy.
4. This is the idea of making ....



13 **Study the following figures, then write:** *(Cairo 2015)*



(a)



(b)

1. The name of the device. (............)
2. The idea of work. (............)
3. One use for it. (............)

TIMSS Like questions on Lesson 4

Guide Answers P. 9

1 Write True or False next to each of the following statements:

1. Electric current has a magnetic effect. (..............................)
2. The core of the electromagnet is made of aluminum. (..............................)
3. Dynamo converts electric energy into magnetic energy. (..............................)
4. The electromagnet is a permanent magnet. (..............................)
5. The magnetism increases by increasing the number of coil turns and increasing the number of batteries. (..............................)

2 Draw circles around the uses of electromagnet:

Big-sized winch	Electric heater	Air conditioner
Electric fan	Disc drive	Television
Stove	Electric mixer	Electric bell

3 Use the terms below to match the statements:

Each work may be used once or more.

(Electromagnet - Dynamo - Ammeter - temporary - wrought iron - Increasing)

a. .... is used to detect the passing of the electric current through a wire.

b. .... changes the mechanical energy into electric energy.

c. .... changes electric energy into magnetic energy.

d. The core of electromagnet is made of ....

e. When an electric current passes through a coil winding around a wrought iron bar, the iron bar becomes a .... magnet.

f. By .... the number of batteries, the magnetic force of the electromagnet increases.

Al-Adwaa Oasis

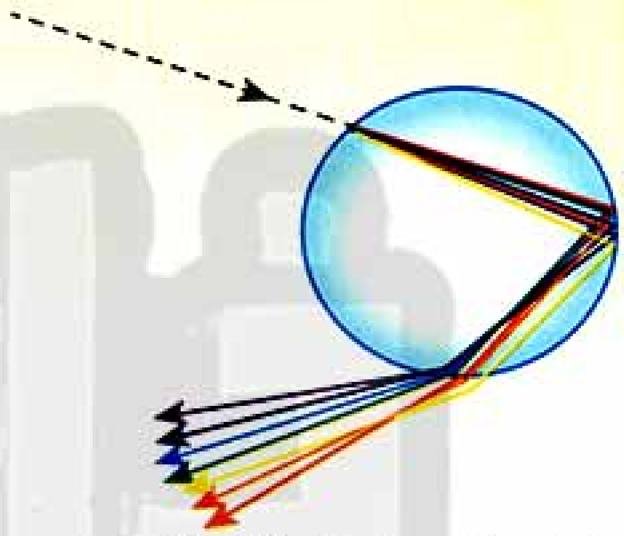
About 950 years ago, Shen Kuo, from China, suggested that the sunlight hit the rain to make rainbows.



White light is split by a prism.

The English scientist, Issac Newton, was the first to explain the rainbow accurately, about 300 years ago. He showed that sunlight (also called white light) is made up of different colors. Our eyes do not see these colors separately.

Newton used a **prism** to demonstrate that white light is a mix of colors. When sunlight passes through a prism, it bends. This is called **refraction**. The angle of bending is different for the various colors of light: red, orange, yellow, green, blue, indigo and violet.



Red light is reflected at a bigger angle than violet light.

In a rainbow, every raindrop acts as a tiny prism. The sun shines through the raindrops and light is refracted, giving a rainbow.

Find the Differences



There are 12 differences. Try to find them.



Unit 2 MIXTURES

Lesson 1 Mixtures

Lesson objectives:

- Concluding the concept of a mixture.
- Listing some examples of mixtures.
- Distinguishing between different types of mixtures.
- Identifying different methods of separation of mixture components.

Lesson 2 Solutions

Lesson objectives:

- Recognizing the concept of solubility process.
- Listing examples of solvents and solutes in some solutions.
- Distinguishing practically between the solubility of materials.
- Performing experiments to investigate factors affecting solubility.



LESSON 1

Mixtures

- When you look at the fruit salad, you will find that it is a mixture of components with different shapes, sizes, colors and tastes.
- Soil is a mixture as rocks and sand are its components.
- The properties of a substance in a mixture do not change; that is, rocks in soil are still rocks, sand is still sand, etc.





What is the Mixture?

- It is the combination that keeps the properties of its components. This means that forming a mixture keeps the properties of matter as they were.

mixture	خليط	substance	مادة	soil	التربة
rocks	صخور	sand	رمل	components	مكونات
properties	خواص				

Types of matter

▶ Matter can be classified (according to the number of types of particles) into two types:

1 A pure substance

- It is the substance that is made up of only one type of identical particles.

Ex.



Distilled (pure) water



Sugar



Table salt



Baking soda

2 A mixture

- It is the substance that consists of more than one type of particles.

Ex.



Milk
(A mixture of proteins, fats and carbohydrates)



Tomato sauce
(A mixture of tomato, water and oil)



The atmospheric air
(A mixture of gases such as: oxygen, nitrogen, carbon dioxide, etc.)



Concrete
(A mixture of cement, water and gravel)

G.R.

1. Both sugar and distilled water are considered pure substances.

Because each of them is composed of only one type of identical particles.

2. Both milk and air are considered mixtures.

Because each of them consists of more than one type of particles.

Do you know?

Mineral water is a mixture of water and some minerals such as calcium and magnesium.

matter	المادة / المواد	identical particles	جزيئات متماثلة	distilled water	ماء مقطر
baking soda	صودا الخبيز	atmospheric air	الهواء الجوى	concrete	خرسانة

1. Types of mixtures:

▸ There are many types of mixtures as shown below:

Solid-solid

It consists of two or more different solid materials.





Liquid-liquid

It consists of two or more different liquids.





Solid-liquid

It consists of solid and liquid materials.





Gaseous-gaseous

It consists of different gases.
The atmospheric air is a mixture of oxygen gas, nitrogen gas, carbon dioxide gas and water vapor.



Gaseous-liquid

It consists of gas and liquid materials.
Soda water is a mixture of carbon dioxide gas dissolved in a sugary solution.



types	أنواع	solid	صلب	vegetable salad	سلطة خضراوات
liquid	سائل	vinegar	خل	gaseous	غازى
dissolved	ذائب	soda water	مياه غازية	sugary solution	محلول سكرى

Watch Video

Mixtures can be classified into:

1 A homogeneous mixture

A type of mixtures in which we cannot distinguish between the components by our eyes.

Ex. **Milk and mineral water.**

2 A heterogeneous mixture

A type of mixtures in which we can distinguish between the components by our eyes.

Ex. **Mixtures of sand and water and also vegetable salad.**

N.B. Solution is a specific type of homogeneous mixture, whose components are combined and mixed together in a way you can't distinguish between their particles.

2. Properties of mixtures:

1 Separated easily

The components of the mixture do not combine together and can be separated easily.

Example



You can separate the pieces of banana from the fruit salad easily.

2 Keeping properties

Each component in the mixture keeps its own properties.

Example



The tomato keeps all its properties (taste, color) before and after mixing.

3 Mixed by any ratio

The components of the mixture can be mixed by any ratio.

Example



You can add the desired amount of sugar in your tea.

homogeneous	متجانس	heterogeneous	غير متجانس	mineral water	مياه معدنية
combine	يمتزج	separate	يُفصل	keep	يحتفظ بـ
taste	طعم	mixing	خلط	add	يضيف
desired	مفضّل	properties	خصائص	ratio	نسبة

3. Formation of mixtures:

- Mixtures can be formed by different methods such as:

(1) Shaking. (2) Stirring. (3) Grinding.

(1) **A solid-liquid mixture** | **can be mixed** by shaking or stirring.



Ex. A mixture of sugar and water.

(2) **A liquid-liquid mixture** | **can be mixed** by shaking or stirring.



Ex. A mixture of strawberry juice and banana juice.

(3) **A solid-solid mixture** | **can be mixed** by shaking or grinding.



Ex. A mixture of salt and pepper.

Do you know?

- Metals are mixed by fusion, then cooled to form alloys and are used in industry such as: gold.
- The pure gold contains 24 carats of raw gold which is very soft and can't be shaped easily, so pure gold is mixed with zinc and silver to form gold alloys which are more strong and easily shaped.





methods	طرق	shaking	الرج	stirring	التقليب
grinding	الطحن	metals	معادن	fusion	انصهار
alloys	سبائك	industry	صناعة	pure gold	ذهب نقى
carat	قيراط (وحدة قياس الذهب)	raw gold	ذهب خام	silver	فضة

Activity How can you make a mixture?

Materials A conical flask with a lid – water – vinegar – oil – sand – salt.

Steps	Illustration	Observation
(1) Add an amount of salt to an amount of water in the flask. (2) Put the lid on the flask and shake it gently, then wait a minute.		Salt dissolves in water and disappears forming a salty solution which cannot be affected over time.
(3) Repeat the previous steps by adding oil to water.		On shaking, they combine with each other and then oil separates from water over time.
(4) Repeat by adding sand to water.		On shaking, they seem to be mixed, but over time sand precipitates.
(5) Repeat by adding vinegar to water.		Water and vinegar are mixed together giving a mixture that cannot be affected over time.

Conclusion Mixtures can be formed by mixing two or more different substances together.

conical flask	إناء مخروطى	lid	سدادة	add	أضف
gently	برفق	dissolve	يذوب	salty solution	محلول ملحى
combine	يتحد	separate	ينفصل	precipitate	يترسب

Benchmark

Selected from Previous Exams

(Guide Answers: P. 9)

1 Complete the following:

1. Mineral water is a mixture of water and minerals such as .... and ....
(Gharbia Educational 2016)
2. .... is considered a pure substance. *(Sohag 2016 / Cairo 2017)*
3. .... and .... are among the methods of forming mixtures.
(Qena 2015 / Giza 2017)

2 Give a reason for each of the following:

1. Air is a mixture. *(Cairo 2016)*
....
2. Distilled water and sugar are pure substances. *(Giza, Qalubia 2016)*
....

3 Give one example for the following:

- Gas-liquid mixture. *(Qalubia 2016)* (................................)

4 Choose the correct answer:

1. Most mixtures which are formed by dissolving in liquids are .... *(Cairo, El-Zeitoun 2016)*
a. homogeneous b. heterogeneous c. identical
2. All these methods are used to form mixtures except .... *(Cairo 2017)*
a. shaking b. grinding c. stirring d. filtration

5 Write the scientific term:

1. A mixture which we can't distinguish between its components.
(Giza 2015) (................................)
2. The substance that is made up of only one type of identical particles.
(Gharbia 2015 / Qalubia 2017) (................................)
3. Substances that consist of more than one type of particle.
(Cairo 2017) (................................)

Try to solve Worksheet 9 Page 37

4. Separation of mixtures:

- The components of the mixture can be separated easily by simple methods. **G.R.**
  Because they do not react together.

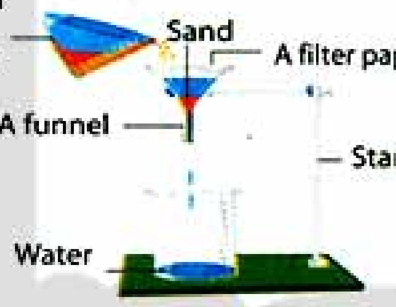
Methods of separation:

1. Magnetic attraction — Used to separate solid mixtures that contain magnetic substances.



Ex. Sand and iron filings.

2. Filtration process — Used to separate mixtures of insoluble solid materials and water.



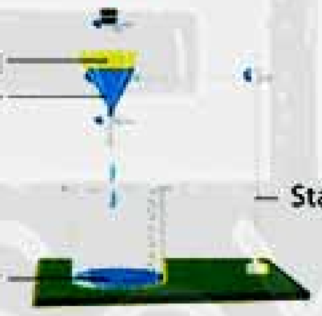
Ex. Sand and water.

3. Evaporation process — Used to separate some mixtures of soluble solid materials and water.



Ex. Salty solution.

4. Separating funnel — Used to separate heterogeneous liquid mixtures.



Ex. Oil-water mixture.

Activity: Separation of a solid mixture by a magnet

Watch Video

Materials A magnet – sand – iron filings.

Step	Illustration	Observation
Approach a magnet to a mixture of sand and iron filings as shown in the opposite figure.		The magnet attracts iron filings only.

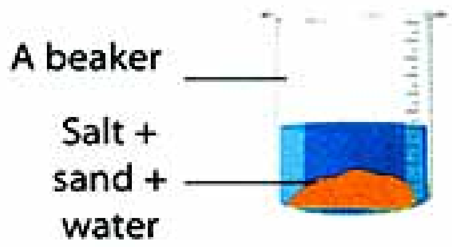
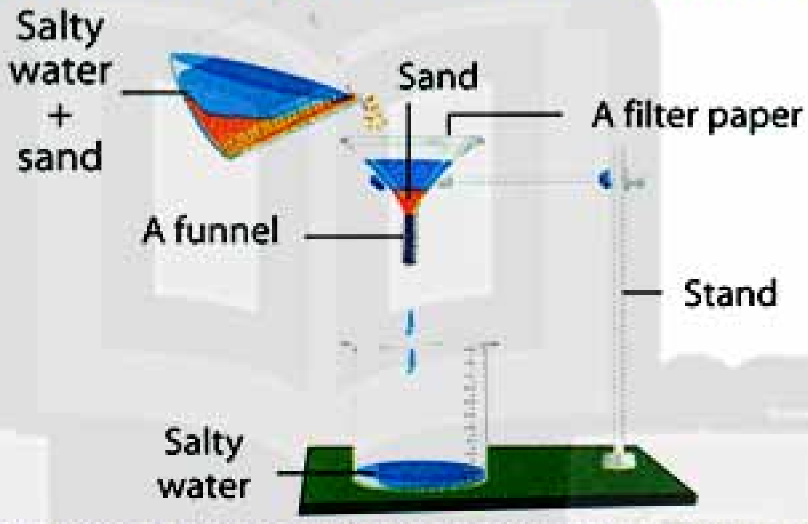
Conclusion A magnet is used to separate solid mixtures that contain magnetic substances such as iron.

separation	فصل	react	يتفاعل	filtration	الترشيح
insoluble	غير قابل للذوبان	evaporation	تبخر	soluble	قابل للذوبان

Activity The separation of solid - liquid mixture sand, salt and water.

Watch Video

Materials Salt – sand – a funnel – a filter paper – two beakers – a flame – a stand.

Steps	Illustration	Observation
① Form a mixture of salt, sand and water in a beaker and stir it well.		The salt dissolves in water, while the sand does not dissolve.
② Pour the mixture into the funnel that has the filter paper as shown in the figure.		The filter paper separates sand and lets the salty solution pass through.
③ Boil the filtrate (salty solution) gently.		The water evaporates and the salt remains in the beaker.

Conclusion

- Filtration process: is used in separating the solid materials that are insoluble in water such as sand.
- Evaporation process: is used to separate some solid materials that are soluble in water such as salt.

G.R. **Filtration process is used to separate sand from a salty solution.**
Because it used to separate solid materials (such as sand) which are insoluble in water.

form	كوِّن	stir	قلِّب	pour	اسكب
funnel	قمع	filter paper	ورقة ترشيح	salty solution	محلول ملحى
boil	اغلِ	filtrate	المُرشَّح	remain	تبقى

NOTE Table salt is collected by evaporation process of seawater in special places called (salt pans).



Activity The separation of a water-oil mixture «heterogeneous liquid mixture».

Materials Oil – water – a glass – a separating funnel – a beaker.

Steps	Illustration	Observation
① Add an amount of oil to a glass containing water and shake it well.		Oil does not mix with water, but it forms a layer on the water surface.
② Pour the mixture in the separating funnel. ③ Use the funnel tap to separate water from oil.		Firstly, the water falls down from the separating funnel into the beaker, while oil remains inside the separating funnel.

Conclusion The separating funnel is used to separate between the components of the heterogeneous liquid mixtures such as: a (water-oil) mixture.

NOTE Oil does not mix with water, but it forms a layer on the water surface (floating).

Try to solve Worksheet 10 Page 39

seawater	مياه البحر	salt pans	الملاحات	separating funnel	قمع فصل
oil	زيت	shake	رج	layer	طبقة
funnel tap	صنبور القمع				

Brief

▶ Matter can be classified into:

A pure substance	A mixture
▸ It is the substance that is made up of only one type of identical particles.	▸ It is the substance that consists of more than one type of particles.
Such as: - Distilled water - Sugar - Table salt - Baking soda	**Such as:** - Milk - Tomato sauce - The atmospheric air - Concrete

Types of mixtures

1. Solid-solid mixture such as: fruit salad.
2. Liquid-liquid mixture such as: oil and water.
3. Solid-liquid mixture such as: sand and water.
4. Gaseous-gaseous mixture such as: the atmospheric air.
5. Gaseous-liquid mixture such as: soda water.

Properties of mixtures

1. The components of the mixture do not combine together and can be separated easily.
2. Each component in the mixture keeps its own properties.
3. The components of the mixture can be mixed by any ratio.

Methods of formation of mixtures

1. Shaking.
2. Stirring.
3. Grinding

Methods of separation of mixtures

1. Magnetic attraction.
2. Filtration process.
3. Evaporation process
4. Separating funnel

Exercises on Lesson 1

Guide Answers P. 9

Solve Ex.

1 Choose the correct answer:

1. All of the following are examples of mixtures except .... *(Gharbia 2016)*
   a. baking soda b. concrete c. milk d. tomato sauce
2. Among the examples of pure substances is .... *(Cairo 2017)*
   a. concrete b. distilled water c. milk d. tomato sauce
3. A solid-solid mixture consists of ....
   a. solid and liquid materials b. gaseous and liquid materials
   c. two or more different liquids d. two or more different solids
4. Among the examples of solid-solid mixtures is the ....
   a. mixture of vinegar and water b. mixture of sand and water
   c. mixture of fruit salad d. atmospheric air
5. A liquid-liquid mixture consists of .... *(Cairo 2015)*
   a. solid and liquid materials b. gaseous and liquid materials
   c. two or more different liquids d. two or more different solids
6. Milk, concrete and tomato sauce are considered .... *(Cairo 2017)*
   a. mixture b. pure substances
   c. solution d. (a) and (b)
7. A solid-liquid mixture consists of ....
   a. solid and liquid materials b. gaseous and liquid materials
   c. two or more different liquids d. two or more different solids
8. Among the examples of solid-liquid mixture is the ....
   a. mixture of vinegar and water b. mixture of sand and water
   c. mixture of fruit salad d. atmospheric air
9. A gaseous-gaseous mixture consists of ....
   a. solid and liquid materials b. different gases
   c. two or more different liquids d. two or more different solids
10. Among the examples of gaseous-gaseous mixtures is the ....
    a. mixture of vinegar and water b. mixture of sand and water
    c. mixture of fruit salad d. atmospheric air
11. A gaseous-liquid mixture consists of ....
    a. solid and liquid materials b. gaseous and liquid materials
    c. two or more different liquids d. two or more different solids

12. To separate the mixture of sand and iron filings, use .... *(Cairo 2017)*
    a. filtration
    b. shaking
    c. magnetic attraction
    d. a and c
13. The mixture of soda water is a mixture of ....
    a. solid and liquid materials
    b. carbon dioxide gas in a sugary solution
    c. two or more different liquids
    d. oxygen gas, hydrogen gas, carbon dioxide gas and water vapor
14. The atmospheric air is a mixture of ....
    a. solid and liquid materials
    b. gaseous and liquid materials
    c. two or more different liquids
    d. oxygen gas, nitrogen gas, carbon dioxide gas and water vapor
15. The salt-pepper mixture can be formed by .... *(Dakahlia 2016)*
    a. melting
    b. stirring
    c. grinding
    d. all the previous answers
16. We can separate a sand-water mixture by .... *(Dakahlia 2016)*
    a. separation funnel
    b. Stirring
    c. Grinding
    d. Filtration
17. .... is used to separate a mixture of oil and water. *(Cairo 2017)*
    a. Separation funnel
    b. Stirring
    c. Grinding
    d. Filtration and evaporation processes

2 Complete the following sentences:

1. Matter can be classified into .... and ....
2. The substance that is made up of only one type of identical particles is known as ...., while that which consists of more than one type of particles is known as ....
3. Both sugar and distilled water are considered ....
4. Both milk and concrete are considered ....
5. .... is a pure substance, while .... is a mixture.
6. Among the types of mixtures are ...., ... and ....
7. A solid-solid mixture consists of .... or more different .... materials, such as ....
8. A liquid-liquid mixture consists of .... or more different .... materials, such as ....
9. A solid-liquid mixture can be mixed by .... or .... *(Cairo 2017)*
10. A gaseous-gaseous mixture consists of different .... such as ....
11. A gaseous-liquid mixture consists of .... and .... materials.

12. The atmospheric air is a mixture of .... gas, ... gas, carbon dioxide gas and ....
13. A mixture of soda water is produced from dissolving .... gas in .... solution.
14. Each component of a mixture keeps its ....
15. The components of a mixture can be .... by any ....
16. .... is the mixture which we cannot distinguish between its components, while the .... is a mixture that we can distinguish between its components.
17. The mixture of sand and water can be separated by .... *(Cairo Zone, Gharbia 2016)*
18. Mixture of sand and iron fillings can be separated by .... *(Giza, Dokki 2016)*
19. 📖 .... and .... are ways of mixing solid materials.
20. Among the methods of mixture formation are .... and .... *(Cairo 2015, Qalubia 2017)*
21. Sand and salt can be mixed by .... or ....
22. .... and .... are methods to form liquid mixtures.
23. The magnetic attraction is used to separate a .... mixture that contains .... substances.
24. .... is used to separate an oil-water mixture.
25. Evaporation process is used to separate some .... materials that are .... in water.

3 **Put (✓) in front of the correct statement and (✗) in front of the incorrect one and then correct it:**

1. Concrete is an example of a solution. ( )
2. Milk is considered a mixture. *(Gaber L.S 2016)* ( )
3. 📖 The mixture of fruit salad is an example of solid-solid mixtures. ( )
4. The liquid-liquid mixture consists of gaseous and liquid materials. ( )
5. Oil-water mixture is a homogeneous mixture. ( )
6. A mixture of vinegar and water is an example of solid-liquid materials. ( )
7. The gaseous-gaseous mixture consists of different gases. ( )
8. We can use evaporation process to separate crushed coffee from water. *(Cairo 2017)* ( )
9. A mixture of soda water is an example of gaseous-liquid mixtures. ( )
10. The atmospheric air is a mixture of gaseous and liquid materials. ( )
11. 📖 Mixtures can be formed by shaking, grinding or stirring. *(Assiut 2017)* ( )
12. 📖 Solubility, filtration and evaporation are ways of separating materials. ( )
13. The oil and water can be separated by filtration. *(Giza 2017)* ( )
14. We can separate a heterogeneous liquid mixture by filtration. *(Alagoza 2016)* ( )

15. Separating funnel is used for separating heterogeneous liquid mixtures. ( )
16. Filtration is used to separate an oil-water mixture. *(G.L.S 2016)* ( )
17. Salt and water are mixed together by stirring or heating. ( )
18. Filtration is used to separate a mixture that has a soluble solid material. ( )
19. We use the filtration process to separate mixtures which have deposits. ( )
20. We can use the evaporation process to separate crushed coffee from water. ( )

4 Write the scientific term for each of the following:

1. Substances that consist of only one type of identical particles. *(Cairo 2017)* (..........)
2. Substances that consist of more than one type of particles. *(Giza 2017)* (..........)
3. A type of matter whose components keep their own properties. (..........)
4. A mixture produced by dissolving carbon dioxide gas in a sugary solution. (..........)
5. A mixture that results from the solubility of solids in liquids. *(Giza 2017, Cairo 2016)* (..........)
6. Adding an amount of sugar to water with stirring. *(Cairo 2017)* (..........)
7. A mixture of oxygen gas, nitrogen gas, carbon dioxide gas and water vapor. (..........)
8. A mixture of water and some useful minerals. (..........)
9. Leaving an amount of seawater exposed to the sun rays for many days. (..........)
10. Heating a salty solution gently. (..........)
11. A method that is used to separate iron material from sand. *(Giza 2017)* (..........)
12. Places where table salt is collected by the evaporation of seawater. (..........)

5 Correct the underlined words:

1. The substance that is made up of only one type of identical particles is known as a mixture.
2. Milk is an example of a pure substance. *(Qalubia 2017)*
3. Seawater is an example of heterogeneous mixtures.
4. The atmospheric air is an example of liquid-liquid mixtures.
5. A sugary solution can be formed by shaking or grinding.
6. A mixture of vinegar and water is an example of solid-liquid mixtures.
7. Mixtures can be separated by magnetic attraction, grinding and evaporation.
8. We can separate salt from seawater by magnetic attraction. *(Cairo 2017)*
9. Sand and water can be separated by evaporation. *(Cairo 2017)*
10. Separating funnel is used to separate a mixture of sugar and water.

6 Choose from column (B) what suits column (A):

1.

(A)	(B)
1. Distilled water	a. is a solid-liquid mixture.
2. Seawater	b. is a pure substance.
3. Oil and water mixture	c. is a homogenous liquid mixture.
4. Vegetable salad	d. is a heterogeneous liquid mixture.
	e. is a solid-solid mixture.

1. .... 2. .... 3. .... 4. ....

2. *(Sohag 2016)*

(A)	(B)
1. Salt from salt solution	a. can be separated by a separation funnel.
2. Oil and water mixture	b. can be separated by evaporation.
3. Pure water	c. can be separated by filtration.
4. Iron filings and sand mixture	d. can be separated by using a magnet.
	e. is a pure substance.

1. .... 2. .... 3. .... 4. ....

7 Give a reason for each of the following:

1. Sugar is a pure substance. *(Giza 2016 / E.L.S. 2015)*
....
2. Distilled water is a pure substance, while mineral water is a mixture. *(Qalubia 2016)*
....
3. Solution is a type of mixture.
....
4. Air is considered a mixture.
....
5. No mixing happens when adding sand to water. *(Giza 2017)*
....
6. A fruit salad mixture is considered an example of solid-solid mixtures.
....
7. The mixture of vinegar and water is considered an example of liquid-liquid mixtures.
....

8. A soda water mixture is considered an example of gaseous-liquid mixtures.

....

9. A magnet can be used to separate iron filings from sand.

....

10. Some mixtures can be separated by using a separating funnel.

....

8 What happens when...?

1. Mixing salt with water.

....

2. Shaking or stirring some sugar with water.

....

3. Heating salty water for a long time.

....

4. Dissolving carbon dioxide gas in a sugary solution. *(Giza 2017)*

....

5. Leaving an amount of seawater exposed to sunlight for days.

....

6. Mixing different types of juices together.

....

7. Approaching a magnet to a mixture of sand and steel paper clips.

....

9 Cross the odd word out:

1. Sugar – salt – baking soda – concrete *(Sayda, Giza 2016)* (..............................)
2. Tomato sauce – apple juice – strawberry juice – banana juice (..............................)
3. Magnet – separating funnel – stirring – filter paper (..............................)
4. Grinding – stirring – shaking – evaporation *(Giza 2016)* (..............................)

10 Mention one use for each of the following:

1. A filter paper. *(Dakahlia 2016 / Cairo 2015)* (..............................)
2. A separating funnel. *(Cairo 2015 / Giza 2017)* (..............................)
3. Stirring. (..............................)
4. Filtration process. (..............................)
5. Evaporation process. (..............................)
6. Grinding process. *(Qalubia 2016)* (..............................)

11 Show how you can separate the following:

1. Salt from salty water. *(El-Zeitoun 2016)*

   ....

2. Sand from water-sand mixtures.

   ....

3. A mixture of steel paper clips and flour. *(Zeitoun, Alex 2016)*

   ....

4. Coffee from water.

   ....

5. Oil from water. *(Alex, Alagoza 2016 / Giza 2017)*

   ....

6. Sand, salt and iron filings. *(Alagoza 2016 / Giza 2017)*

   ....

7. Chalk from water. *(El-Zeitoun 2016)*

   ....

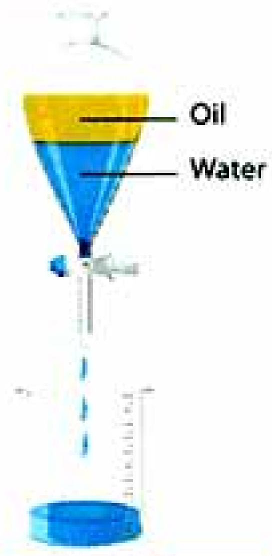
8. Salty solution.

   ....

12 Define the following:

1. A pure substance. *(Alex, Borg Alarab 2012)* (..)
2. Mixture. (..)
3. A solid-solid mixture. (..)
4. A liquid-liquid mixture. (..)
5. The atmospheric air. (..)
6. A solid-liquid mixture. (..)
7. A gaseous-gaseous mixture. (..)
8. A gaseous-liquid mixture. (..)
9. A soda water mixture. (..)

13 Look at the opposite figure and then answer the following: *(Rod El-Farag, Cairo 2016)*



1. What is shown by this figure?

   ....

2. Why do we use this tool in separating some types of mixtures?

   ....

3. What is the type of the mixture that can be separated by this tool?

   ....

14 **Look at the opposite figure and then answer the following:**



1. What is the type of this mixture?

....

2. Does mixing process affect the properties of each component of the mixture?

....

15 **Study the following figures and then mention:**



• The name of each process and give an example for each process.

A. .... such as .... B. .... such as ....

C. .... such as .... D. .... such as ....

16 **When do we use the following separating methods and mention an example for each?**

1. Filtration process.

....

2. Evaporation process.

....

17 **Compare between:** *(Alagoza 2016)*

Pure substance	Mixture
....	....
....	....

تفوقك في أي عمل عليه العلامة دي

TIMSS Like questions on Lesson 1

Guide Answers P. 10

1 Write True or False next to each of the following statements:

a. An oil-water mixture is considered a heterogeneous liquid mixture. (..................)

b. The components of a mixture react together and cannot be separated. (..................)

c. Vegetable salad and fruit salad are made up of one type of similar particles. (..................)

d. Sugar and table salt are made up of more than one type of particles. (..................)

e. Shaking and stirring are among the methods of the formation of mixtures. (..................)

2 Draw circles around pure substances among the examples below:

Iron filings	Sand	Vinegar
Oil	Mercury	Tomato sauce
Milk	Atmospheric air	Baking soda
Table salt	Fruit salad	Concrete

3 Evaluate your understanding:

Through such an exercise, you can evaluate how much you understand the main concepts in this unit.

Examine the figure and then answer the following questions:

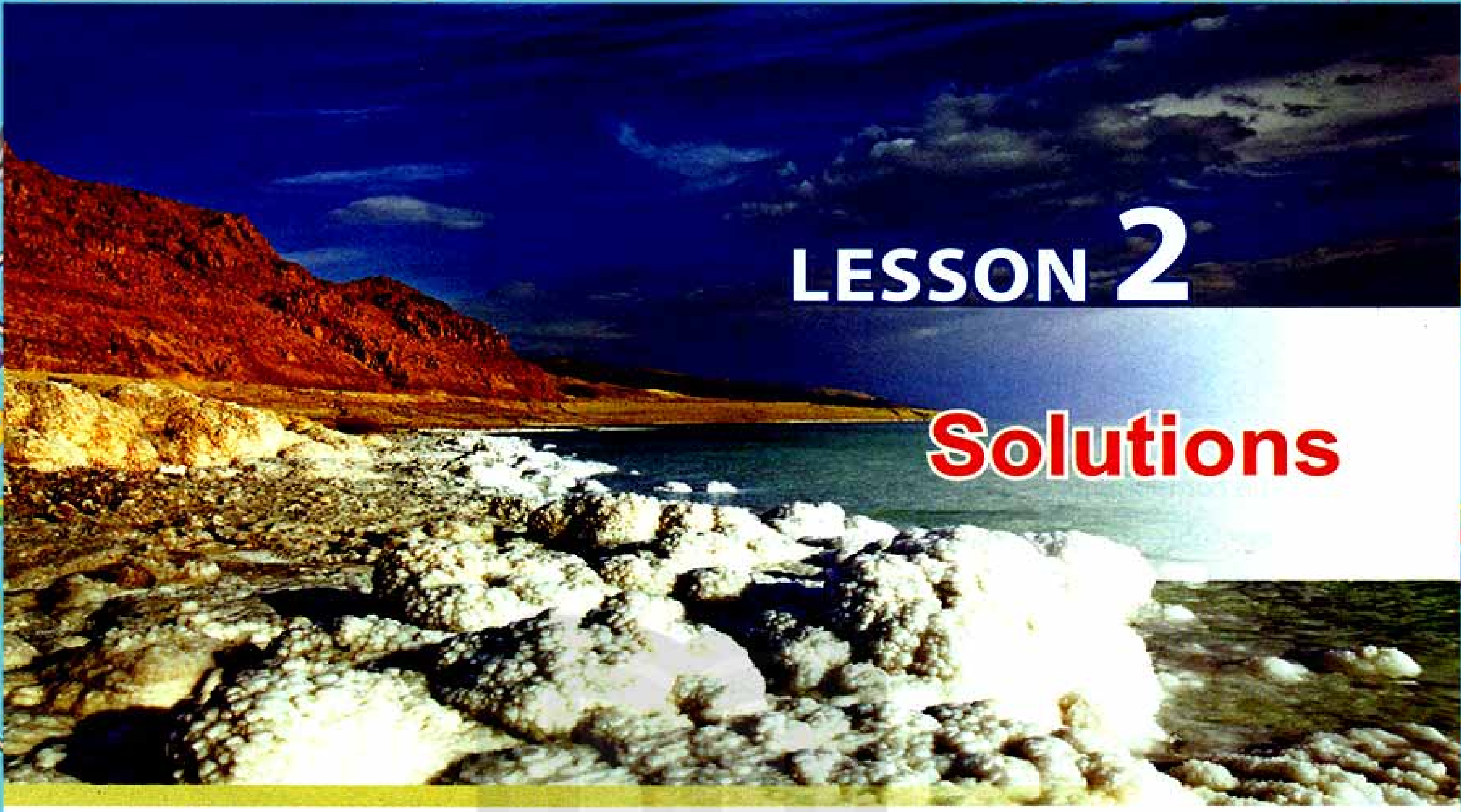
a. What is the type of mixture shown in opposite figure?

....



b. Does the mixing process affect the properties of the mixture components?

....



- In our daily life, we use many liquids like water, juices, tea and liquid cleaners.
- We already know that a mixture is made of two or more substances which may be liquid, solid or gas.
- The liquid mixture is considered "a solution".

What is the Solution?



The mixtures are classified into

Homogeneous mixture	Heterogeneous mixture
The type of mixtures which we cannot distinguish its components by our eyes is called (solution). Ex. A salty solution, apple juice and tea.	The type of mixtures which we can distinguish its components by our eyes is called (suspension). Ex. Mud in water, chalk in water and natural orange juice.





solution محلول suspension معلق mud طين

Solution

The solution

- It is the homogeneous liquid mixture in which the solute breaks down into its most basic particles and spread throughout the solvent.

G.R. **Apple juice is a solution.**
Because it is a homogeneous liquid mixture and its components cannot be distinguished from each other.

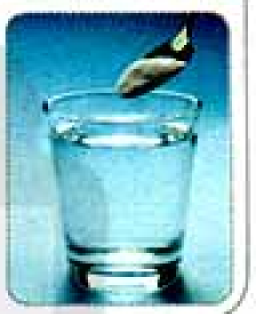
NOTE
The solution is a special type of mixture.

1. Formation of a solution:

- The solution consists of a solvent and a solute.

The solvent	The solute
It is the liquid substance in which a solute disappears or dissolves. Ex. Alcohol, water, etc.	It is the substance which dissolves (disappears) in a solvent. Ex. Salt, sugar, etc.





Activity: Formation of a solution

Materials Salt – water – a container – a glass rod.

Step	Illustration	Observation
Put a spoon of salt in an amount of water and then stir them by using a glass rod.		Salt breaks down into small particles that disappear in the water forming a salty solution.

Conclusion
1. The salty solution consists of: a. Solvent (water) b. Solute (salt)
2. Stirring process is necessary to dissolve the solute in the solvent.

solvent	مذيب	solute	مذاب	container	وعاء
glass rod	قضيب زجاجى	break down	يتحلل	disappear	يختفى
dissolve	يذوب	stirring	تقليب		

Solubility

- It is the process by which a solute dissolves in a solvent leading to the disappearance of the solute.

$$\text{Solute} + \text{solvent} \xrightarrow[\text{process}]{\text{solubility}} \text{solution}$$

G.R.

Water is called a common solvent.
Because thousands of substances dissolve in it.

In a salty solution, salt is considered the solute.
Because it dissolves in the solvent (water) to form the solution.

- **Substances can be classified according to their solubility into:**

A soluble substance	An insoluble substance
• It is the substance that dissolves (disappears) in a solvent.	• It is the substance that does not dissolve (suspends) in a solvent.
• The formed homogeneous mixture is called solution.	• The formed heterogeneous mixture is called suspension.

Suspension

- Heterogeneous liquid mixture in which the particles of the solute are suspended through the solvent and can be separated by filtration process.

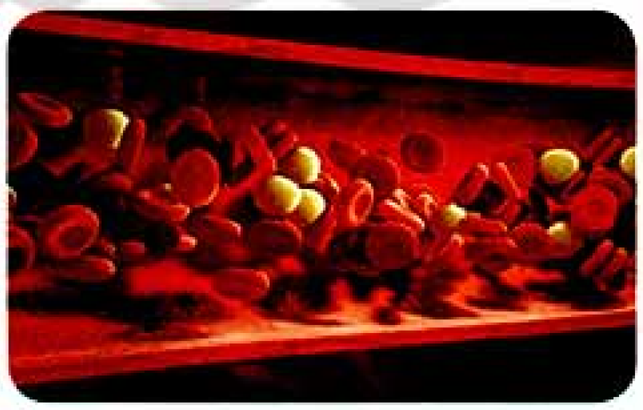
Ex. **Mud in water - natural orange juice.**



Do you know?

Blood is a mixture of elements and compounds because:

1. It contains white blood cells, red blood cells, water and many dissolved substances.
2. The different components of blood can be separated easily, the ratio of these components change daily but the identity of the mixture does not change.



solubility	الذوبان	disappearance	اختفاء	solution	محلول
soluble	قابل للذوبان	insoluble	غير قابل للذوبان	particles	جزيئات
natural	طبيعى	blood	الدم	elements	عناصر
compounds	مركبات	contain	يحتوى على	cells	خلايا
easily	بسهولة	identity	طبيعة		

2. Factors affecting solubility process:

- Solubility process is affected by four factors:

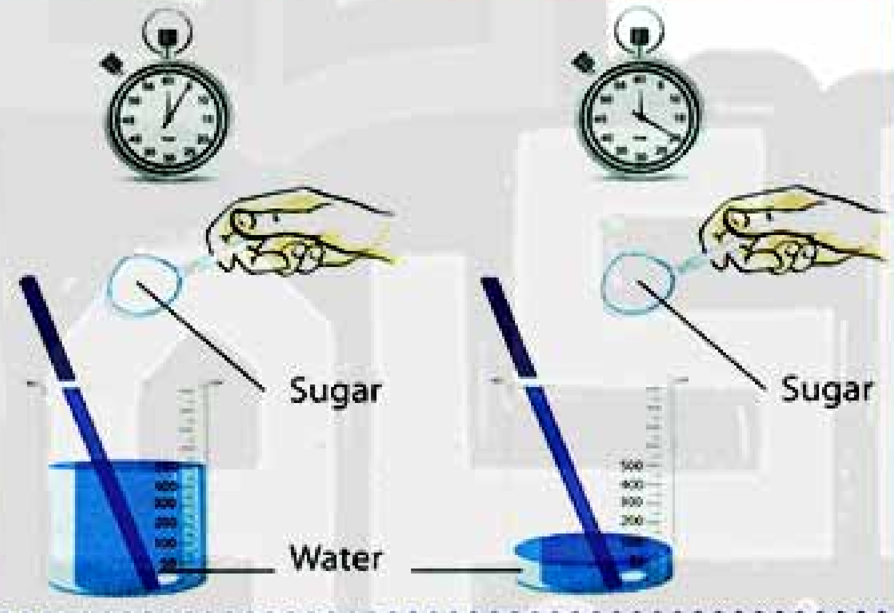
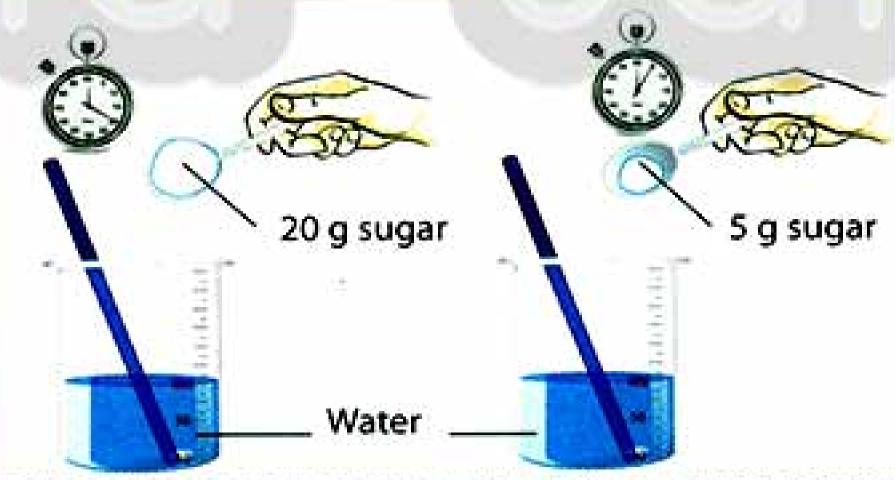
1. Quantity of the solvent and the solute
2. Temperature
3. Stirring
4. Kind of the solute

1. Quantity of the solvent and the solute

- By decreasing the quantity of the solute, solubility increases and vice versa.

Activity To prove that quantities of the solvent and the solute affect solubility process:

Materials Equal quantities of sugar – water – a stopwatch - glass rod - a beaker.

Steps	Illustration	Observation
(1) Put the first quantity of sugar (solute) in 500 ml of water (solvent) and the other in 50 ml of water. (2) Stir well and record the time needed to dissolve sugar completely.		The time needed to dissolve sugar in 500 ml of water is shorter than that needed to dissolve the same quantity in 50 ml of water.
Conclusion	By increasing the quantity of solvent, the solubility increases and vice versa.	
(3) Try to dissolve 20 g of sugar in 100 ml of water. (4) Try to dissolve 5 g of sugar in 100 ml of water. (5) Record the time needed to dissolve sugar.		The time needed to dissolve 5 g of sugar is shorter than that needed to dissolve 20 g of sugar in the same quantity of water.
Conclusion	By decreasing the quantity of the solute, solubility increases and vice versa.	

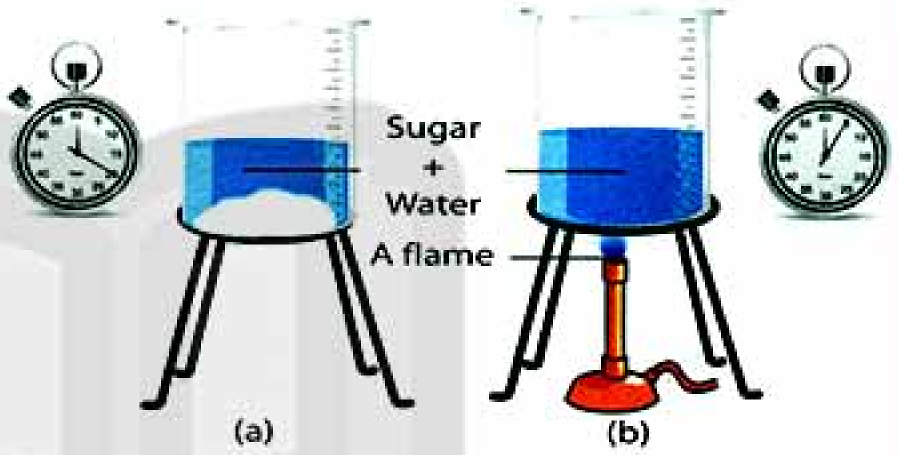
factors	عوامل	vice versa	العكس بالعكس	prove	يثبت
completely	تماماً	quantity	كمية	decreasing	تقليل
increasing	زيادة				

2. Temperature

▶ Increasing temperature increases the speed of solubility process.

Activity To prove that temperature affects solubility process:

Materials Two equal amounts of sugar – water – two beakers – stopwatch - a heater.

Steps	Illustration	Observation
① Put the two equal amounts of sugar in the two beakers containing the same amount of water. ② Heat beaker (b) and leave beaker (a) without heating and then record the time needed to dissolve sugar.		Sugar in beaker (b) takes shorter time to dissolve.

Conclusion **Sugar dissolves in hot water faster than in cold water.**
Because increasing the temperature of water (solvent) increases the speed of solubility process. **G.R.**

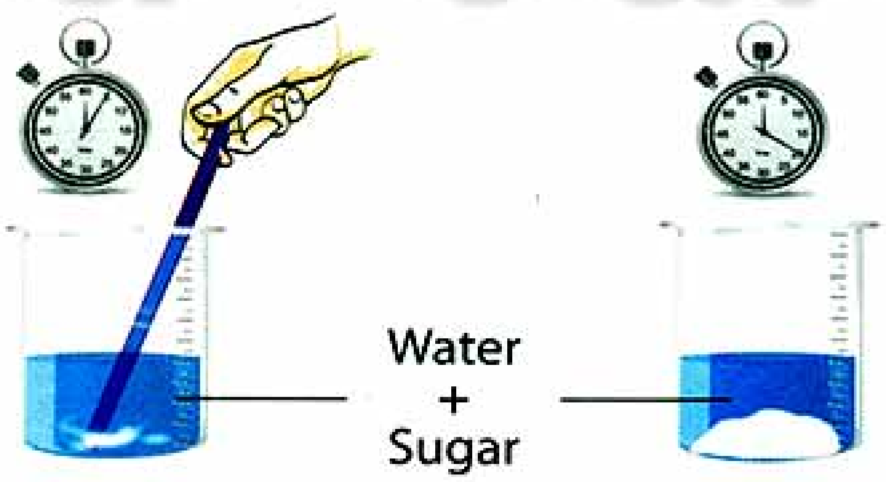
3. Stirring

▶ Stirring increases the speed of solubility process.

Watch Video

Activity To prove that stirring affects solubility process:

Materials Two equal amounts of sugar – water – two beakers - glass rod - stopwatch.

Steps	Illustration	Observation
① Put the two equal amounts of sugar in the two beakers containing the same amount of water. ② Stir the sugar in one beaker and leave the other one without stirring.		By stirring, the sugar takes shorter time to dissolve.

Conclusion Stirring increases the speed of solubility process.

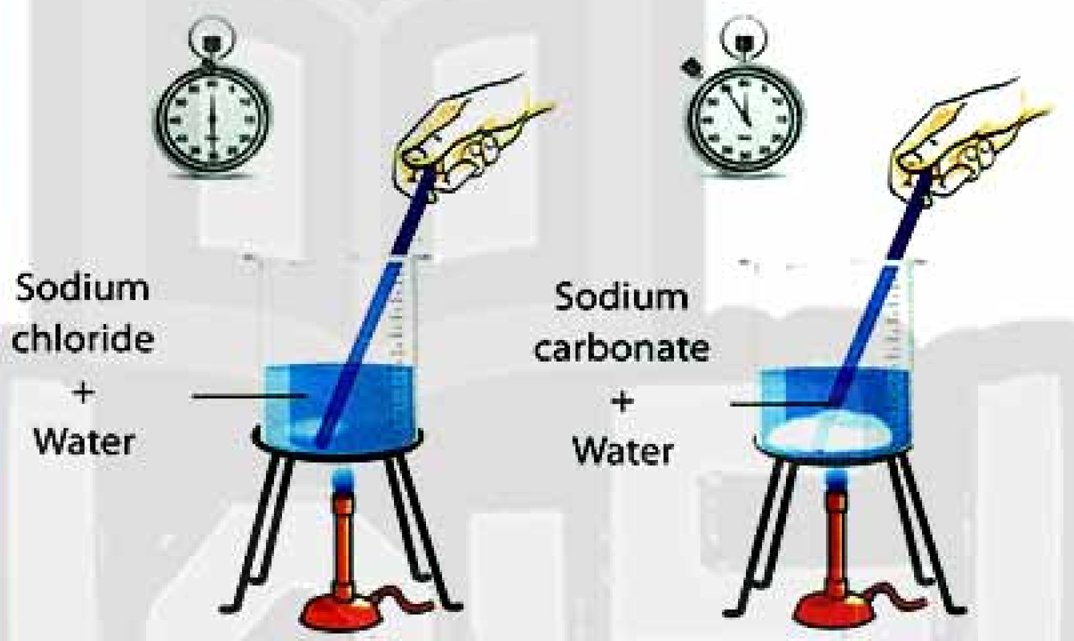
temperature	درجة الحرارة	speed	سرعة
heat	سَخِّن	beaker	مخبار

4. Kind of a solute

- Solubility process depends on the kind of the solute.

Activity To prove that the kind of the solute affects solubility process.

Materials Two equal amounts of (sodium chloride – sodium carbonate) – two beakers – glass rod - stopwatch - a heater.

Steps	Illustration	Observation
(1) Put the two equal amounts of sodium chloride and sodium carbonate in the two different beakers containing two equal amounts of water. (2) Stir both of them. (3) Record the time that is needed to dissolve each substance.		Dissolving sodium chloride in water is faster than dissolving sodium carbonate in the same amount of water.

Conclusion Solubility process depends on the kind of the solute.

Exercise

If you have 3 g of sugar cubes and 3 g of powdered sugar. Which of them dissolves faster in 200 ml of water? Why?

Answer:

3 g of powdered sugar dissolves faster.

Because it has a larger surface area exposed to the solvent and this makes the solubility process faster.

So, grinding solid matrial increases the speed of solubility.

Do you know?

Increasing the surface area of the solid solute for the solvent to work on decreases the time of solubility process.



kind	نوع	depend on	يعتمد على	affect	يؤثر على
beaker	مخبار	record	سَجِّل	surface area	مساحة السطح
cubes	مكعبات	powdered	مسحوق	exposed to	مُعَرَّض لـ

(Guide Answers: P. 10)

Benchmark

Selected from Previous Exams

1 Complete the following:

1. The solution is a type of .... *(Alex 2016 / Cairo 2017)*
2. Increasing temperature .... the solubility time. *(Giza 2017)*
3. Solute + ... $\xrightarrow[\text{process}]{\text{solubility}}$ .... *(Cairo 2016 / Giza 2017)*

2 Choose the correct answer:

1. Most mixtures that are formed by dissolving in liquids are .... mixtures. *(Alagoza, Cairo 2016)*
   a. homogeneous b. heterogeneous c. identical d. (b, c)
2. Salt in water is .... *(Gaber L.S. 2016)*
   a. gas mixture b. solution c. solid mixture d. liquid mixture
3. The common solvent is .... *(Giza 2016)*
   a. alcohol b. tea c. salt d. water

3 Correct the underlined words:

1. Stirring <u>decreases</u> solubility. *(Cairo, Dakahlia 2016)* (..............................)
2. Solubility speed <u>decreases</u> by shaking and raising the temperature. *(Giza 2016)* (..............................)
3. Salty solution is an example of the <u>heterogeneous</u> solution. *(St. Joseph L.S. 2016)* (..............................)

4 Give a reason for each of the following:

- Water is considered a common solvent. *(Cairo 2017, Gharbia 2016)*

....

5 Put (✓) or (✗) in front of each of the following statements:

1. Solubility speed decreases by shaking and raising temperature. *(Sohag 2015)* (   )
2. Increasing the amount of solvent increases the speed of solubility. *(Fayoum 2016)* (   )

Try to solve
Worksheet 11 Page 41
Worksheet 12 Page 43



Brief

The solution:

- It is the homogeneous liquid mixture in which the solute breaks down into its most basic particles and spreads throughout the solvent.
- **The solution consists of:**

1 Solvent

It is the liquid substance in which a solute disappears or dissolves.

Ex.
- Alcohol.
- Water.

2 Solute

It is the substance which disappears or dissolves in a solvent.

Ex.
- Salt.
- Sugar.

Solubility:

Solute + solvent —(solubility process)→ solution

- **Solubility process:**

It is the process by which a solute dissolves in a solvent leading to the disappearance of the solute.

- **Factors affecting solubility process:**

1. Quantity of the solvent and the solute.

   By increasing the quantity of solvent, the solubility increases and vice versa.

   By decreasing the quantity of the solute, solubility increases and vice versa.

2. Temperature.

   By increasing the temperature, the solubility increases.

3. Stirring.

   Stirring increases the speed of solubility process.

4. Kind of the solute.

   Solubility process depends on the kind of the solute.

Exercises on Lesson 2

Guide Answers P. 11

Solve Ex.

1 Choose the correct answer:

1. The solution is a type of .... *(Cairo 2017, Gharbia 2016)*
   a. a homogeneous mixture b. a heterogeneous mixture
   c. a solvent d. (a) and (b)
2. Apple juice is ....
   a. a homogeneous mixture b. a heterogeneous mixture
   c. a suspension d. (a) and (b)
3. Salt in water is .... *(G.L.S 2016)*
   a. gas mixture b. solution c. solid mixture d. no correct answer
4. Tea is ....
   a. a suspension b. a heterogeneous mixture
   c. a solution d. no correct answer
5. Most mixtures that are formed by dissolving in liquids are .... mixtures. *(Alagoza, El-Zeitoun 2016)*
   a. homogeneous b. heterogeneous c. identical d. (b) and (c)
6. The solution consists of ....
   a. a solvent b. a solute c. a solvent and a solute d. no correct answer
7. A solution is made by dissolving some salt in water. The salt is referred to as the ....
   a. solute b. filtrate c. solution d. solvent
8. The common solvent is .... *(Cairo, El-Zeitoun, Giza 2016)*
   a. alcohol b. tea c. salt d. water
9. The substance which dissolves in a solvent is a .... *(Giza 2017)*
   a. solution b. solute c. suspension d. mixture
10. Solute + solvent $\xrightarrow{\text{solubility process}}$ ....
    a. mixture b. suspension c. (a) and (b) d. solution
11. The salty solution consists of .... *(Cairo 2017)*
    a. a solute which is salt b. a solvent which is water
    c. a solute which is water d. (a) and (b)
12. On adding an insoluble substance to a certain solvent a ....
    a. solution is formed b. suspension is formed
    c. homogeneous mixture is formed d. no correct answer
13. Natural orange juice is ....
    a. a heterogeneous liquid mixture b. a suspension
    c. (a) and (b) d. a solution

14. Mud in water can be separated by ....
    a. heating b. stirring c. filtration d. solubility
15. All these factors affect solubility process except ....
    a. temperature b. stirring
    c. the kind of the solute d. filtration
16. Table salt is collected by evaporation of .... *(Cairo 2017)*
    a. distilled water b. sea water c. mineral water d. all the previous answer
17. To decrease the solubility time, you should .... *(Basteen 2016)*
    a. increase the quantity of solvent b. decrease temperature
    c. increase the quantity of solute d. no correct answer
18. Increasing temperature .... the solubility time.
    a. increases b. decreases c. does not change d. no correct answer

2 Complete the following sentences:

1. 📖 The solution is a type of .... *(Alex East 2012/ Gharbia 2016)*
2. Most mixtures that are formed by dissolving in liquids are ....
3. The solution consists of a .... and a .... *(Cairo 2012/ Giza 2016)*
4. .... is called a common solvent.
5. 📖 .... is considered to be a general solvent because of its ability to dissolve most materials. *(Giza 2017)*
6. The substance that dissolves in a solvent is known as ....
7. In the solubility process, the .... dissolves in a .... leading to the disappearance of the solute.
8. The salty solution consists of a solute which is .... and a solvent which is .... *(El-Zeitoun 2016)*
9. Stirring process is necessary for .... the solute in the ....
10. Solute + ... $\xrightarrow{\text{solubility process}}$ .... *(Giza 2017)*
11. In salty solution, salt is considered as .... *(Cairo 2017)*
12. Suspension is a .... liquid mixture in which the particles of the solute are ....throughout the solvent.
13. 📖 Mixing a small amount of mud with water forms .... that can be separated by ....
14. Dissolving sugar in hot water is .... than in cold water.
15. 📖 Increasing the quantity of a solvent .... the solubility time.
16. 📖 Increasing .... reduces the solubility time.
17. 📖 Increasing temperature .... the solubility time. *(Giza 2017)*
18. Shaking has the same effect of .... process.
19. Solubility process depends on the kind of the .... *(Cairo 2015)*
20. Solubility process is affected by .... , ... , ... and ....

3 Put (✓) in front of the correct statement and (✗) in front of the incorrect one and then correct it:

1. The homogeneous mixture is a mixture whose components can be distinguished. (   )
2. The heterogeneous mixture is a mixture whose components can be distinguished. (   )
3. 📖 The mixture of sugar in water is a heterogeneous mixture. (   )
4. Most mixtures formed by dissolving in liquids are homogeneous mixtures. (   )
5. Apple juice, natural orange juice and tea are homogeneous mixtures. (   )
6. Mud in water and natural juice are heterogeneous mixtures. (   )
7. The solution consists of a solute and a solvent. (   )
8. The solute is the substance which dissolves in a solvent. (   )
9. 📖 A solvent is a liquid in which the solid material dissolves. *(Cairo 2015)* (   )
10. 📖 Solute + solvent $\xrightarrow{\text{Solubility process}}$ solution *(G.L.S. 2016)* (   )
11. The suspension can be separated by stirring. (   )
12. 📖 The solubility time increases as the amount of the solvent decreases. (   )
13. Increasing the quantity of solute reduces the solubility time. *(St. Joseph 2016)* (   )
14. 📖 Solubility speed decreases by shaking and rising the temperature. *(Cairo 2017)* (   )
15. 📖 Solubility speed of solids increases by grinding. (   )

4 Write the scientific term for each of the following:

1. The mixture whose components can be distinguished. (..............................)
2. 📖 The material in which the solute disappears. (..............................)
3. The mixture whose components cannot be distinguished. (..............................)
4. The mixture that consists of a solute and a solvent. *(Cairo 2016)* (..............................)
5. The substance in which the solute dissolves or disappears. *(Gharbia 2016 / Giza 2017)* (..............................)
6. The substance which dissolves in a solvent. (..............................)
7. The mixture in which the solute breaks down into its most basic particles and spreads evenly throughout the solvent. (..............................)
8. The mixture in which some particles of the solute are suspended throughout the solvent. (..............................)

9. The process by which a solute dissolves in a solvent leading to the disappearance of the solute. *(Alagoza, St. Joseph, El-Zeitoun 2016)* (..........)
10. A process that needs the presence of a solvent and a solute. (..........)
11. The liquid which is used to dissolve solid substances. (..........)
12. The homogeneous liquid mixture. (..........)
13. The most common solvent. *(Cairo 2016-2017)* (..........)

5 Correct the underlined words:

1. The components of mixtures cannot be separated. *(Rod El-Farag 2016)* (..........)
2. Solubility decreases by shaking and raising the temperature. *(El-Zeitoun 2016)* (..........)
3. The solubility speed of solids decreases by grinding. (..........)
4. Increasing the amount of the solvent decreases the speed of solubility. (..........)
5. Separating funnel is used to separate homogeneous solutions. (..........)
6. In a sugary solution, the solute is water and the solvent is sugar. (..........)
7. Increasing temperature increases dissolving time on forming a solution. *(Cairo, Ahd Gedid 2012)* (..........)
8. Salty solution is an example of the heterogeneous solution. *(St. Joseph 2016)* (..........)
9. Increasing the quantity of a solvent increases dissolving time. (..........)
10. Stirring decreases solubility. *(Dakahlia 2012 / Giza 2016)* (..........)
11. The substance which dissolves forming the solution is called the mixture. (..........)
12. In a sugary solution, the solute is water. (..........)
13. Substances which do not dissolve in water are called soluble substances. (..........)
14. Solubility speed decreases by shaking and raising the temperature. *(Alex, East 2012/ Giza 2016)* (..........)

6 Choose from column (B) what suits in column (A):

1.

(A)	(B)
1. Increasing temperature	a. is a suspension.
2. Increasing the quantity of the solute	b. is a homogeneous mixture.
3. Natural orange juice	c. is the substance which dissolves in a solvent.
4. The solute	d. increases the solubility time.
5. Apple juice	e. reduces the solubility time.

1. .... 2. .... 3. .... 4. .... 5. ....

2.

(A)	(B)
1. The solvent	a. is a mixture of liquid states.
2. The solute	b. is a process of separation of the solute from the solvent.
3. The solution	c. is the substance which exists in a big quantity in the solution.
4. Filtration	d. is a substance which exists in a small quantity in the solution.

1. .... 2. .... 3. .... 4. ....

7 Give a reason for each of the following:

1. A solution is a type of mixtures.
....
2. There are different types of mixtures.
....
3. A salty solution is a homogenous mixture.
....
4. Natural orange juice is a heterogeneous mixture.
....
5. Apple juice is a solution.
....
6. Water is considered a common solvent. *(Sinai 2015 / Cairo 2017)*
....

7. The time of dissolving sodium chloride in water differs from that of dissolving sodium carbonate in the same amount of water.

....

8. Solubility speed increases by increasing the temperature of the solution components.

....

9. Dissolving an amount of table salt in an amount of hot water is faster than dissolving the same amount of table salt in the same amount of cold water.

....

10. The dissolving time of any solid substance in a liquid decreases by stirring and heating.

....

11. The suspension can be separated by filtration.

....

12. The solubility time increases as the amount of the solvent decreases.

....

8 What happens when...?

1. Putting a spoonful of salt in an amount of water and then stirring by using a glass rod.

....

2. Stirring two equal amounts of sugar in two beakers containing unequal amounts of water.

....

3. You have two beakers containing equal amounts of water and equal amounts of sugar, heat one of the two beakers and leave the other without heating.

....

4. Increasing the quantity of a solute.

....

5. Increasing the quantity of a solvent.

....

9 What is meant by...?

1. A homogeneous mixture.

....

2. A heterogeneous mixture.

....

3. A solution.

....

4. A solute.

....

5. A solvent.

....

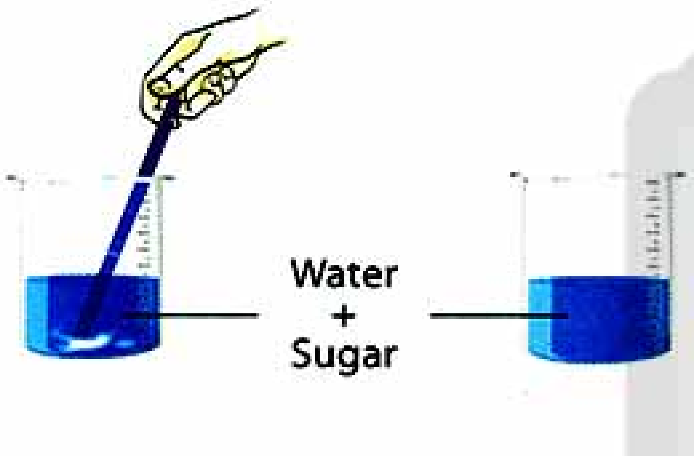
6. Solubility process.

....

7. Suspension.

....

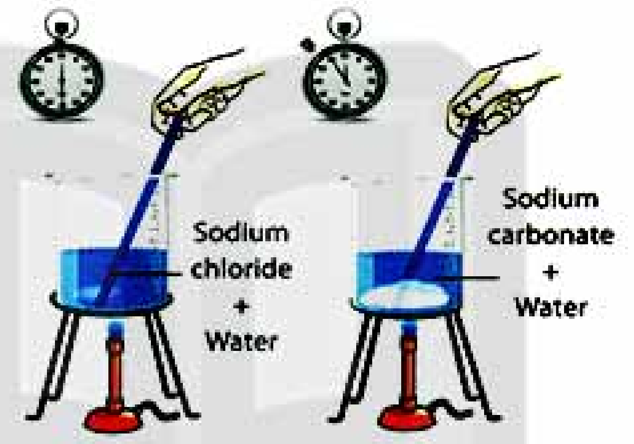
10 Study the following figures and then write your observation and conclusion:



(a)

Observation: ....

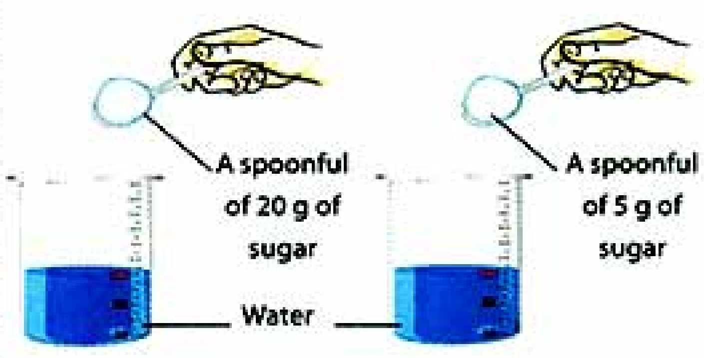
Conclusion : ....



(b)

Observation: ....

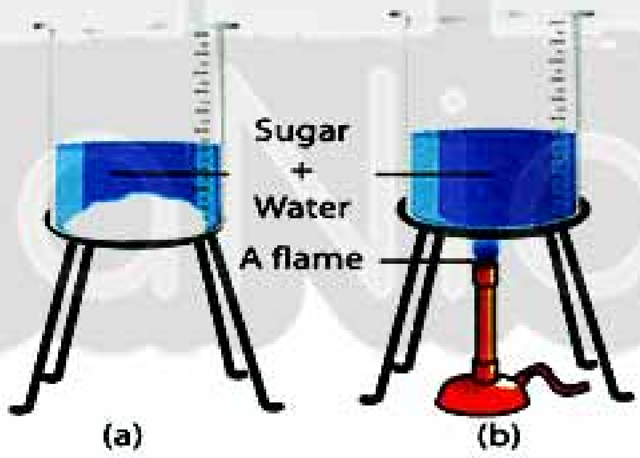
Conclusion : ....



(c)

Observation: ....

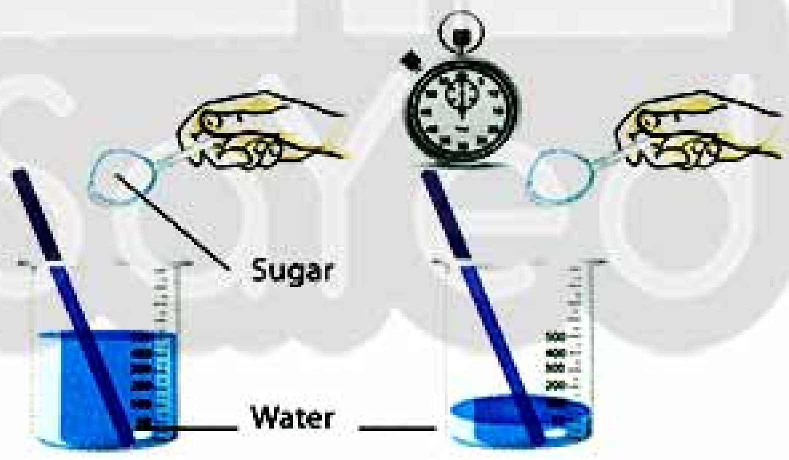
Conclusion : ....



(d) *(Cairo 2015)*

Observation: ....

Conclusion : ....



(e)

Observation: ....

Conclusion : ....

11 Mention the difference between:

1. A mixture and a solution.

....

2. The natural orange juice and apple juice.

....

3. A solute and a solvent.

....

4. Grinding and shaking.

....

12 **Which of the following processes takes place faster than the others and why?**

1. Dissolving a quantity of table salt in hot water or dissolving the same quantity of table salt in cold water.

....

2. Dissolving a quantity of sugar in water and stirring or dissolving the same quantity of sugar in the same quantity of water without stirring.

....

3. Dissolving an amount of salt in 100 ml of water or dissolving the same quantity of salt in 300 ml of water.

....

13 **How does temperature affect the solubility process?**

....

....

14 **Prove by an experiment the effect of temperature on the solubility process.**

....

....

....

15 **Evaluate your understanding:**

Through such an exercise, you can evaluate how much you understand the main concepts in this unit.

Examine the figures and then answer the following questions:

1. a. What is the type of mixture that is being separated in Fig. (1)?

....

b. What is the tool used in separating this mixture?

....



Fig. (1)

2. a. Is what shown in Fig. (2) a mixture or a pure substance?

....

b. Why do we use gold alloys in making jewelry?

....

c. Give some examples of everyday applications in which we use alloys.

....



Fig. (2)

3. a. What is shown in Fig. (3)? *(Cairo, Dakahlia 2016)*

....

b. Why do we use the separating funnel in separating some types of mixtures?

....

c. What are the substances that can be separated by the separating funnel?

....



Fig. (3)

16 **Mention the factors affecting solubility process:**

1. ....
2. ....
3. ....
4. ....

TIMSS Like questions on Lesson 2

Guide Answers P. 12

1 **Draw a circle around the solutes among the examples below:**

Milk	Vinegar	Kerosene
Water	Salt	Sugar
Oil	Sand	Iron filings
Chocolate	Alcohol	Sawdust

2 **Two children tried to find the answer to this question.**



- Does salt dissolve faster in hot water than in cold water?

This is what they found out:

Temperature of water	Time (in seconds) taken to dissolve salt
Very cold	50
Cold	40
Warm	35
Hot	20

1. At which temperature did the salt dissolve fastest?

....

2. At which temperature did the salt dissolve slowest?

....

3. What would happen to the salt in iced water?

....

3 **Sara added a colored substance to water.**

After ten minutes, the color was evenly spread in the water and the substance at the bottom of the beaker has disappeared.



1. a. Is this an example of a solution?

....

b. Give two reasons for your answer.

....

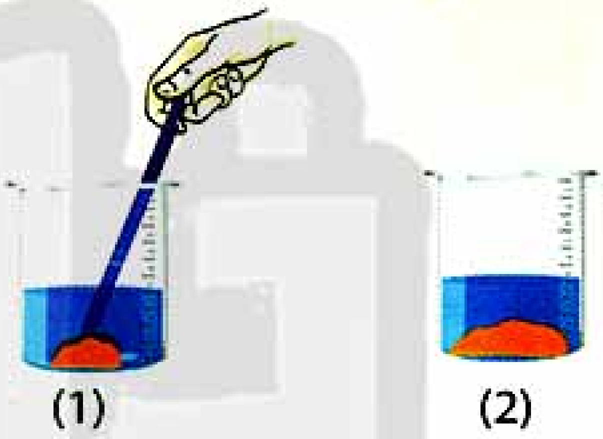
2. Name the two parts of a solution.

....

3. Name one way that you can tell if a liquid is a mixture or a pure substance.

....

4 **The picture shows a test to find out about factors that affect dissolving.**



1. Which factor that affects dissolving is being tested?

....

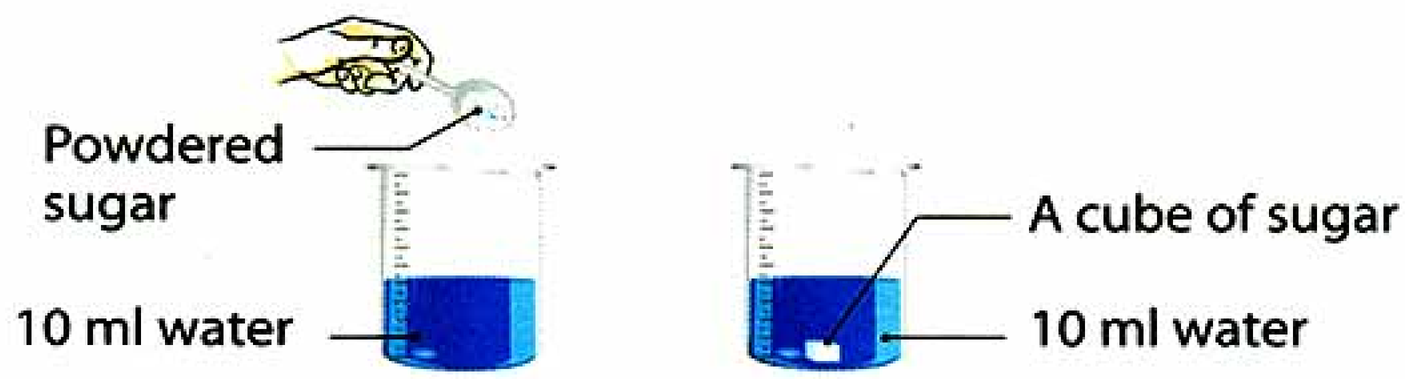
2. Which factors are the same in both beakers?

....

3. Which factors are different in the beakers?

....

5 **10 ml of water and the same mass of sugar was put into separate test tubes and the contents were stirred until all the sugar had dissolved.**



Which sugar dissolved quickest?

....

....

6 Adam and Salma compared how long it took for different kinds of sugar to dissolve in warm water. They conducted a fair test. These are the results.

Sugar	Time (in seconds) taken to dissolve
Sugar lump	90
Sugar grains	45
Powdered sugar	30

1. Which factor that affects dissolving did they investigate?

....

2. What pattern can you see in their results?

....

3. What could they conclude from their investigation?

....

4. a) How would their results be different if they dissolved the sugar in cold water?

....

b) Explain why.

....

....

Al-Adwaa Oasis

Musa stirred sugar into cups of warm water.
In cup (a) he could dissolve 2 spoonfuls.
In cup (b) he could dissolve 4 spoonfuls.
In cup (c) he could dissolve 7 spoonfuls.



If he tried this with sand instead of sugar, what would happen?



Help the child to reach the cup!

Sensible and silly materials

Metal is a sensible material for a pan because of its properties. What would happen if the pan was made of wood?



Here are some other objects made from silly materials.





Unit 3 ENVIRONMENTAL BALANCE



Lesson 1 Food relationships among living organisms

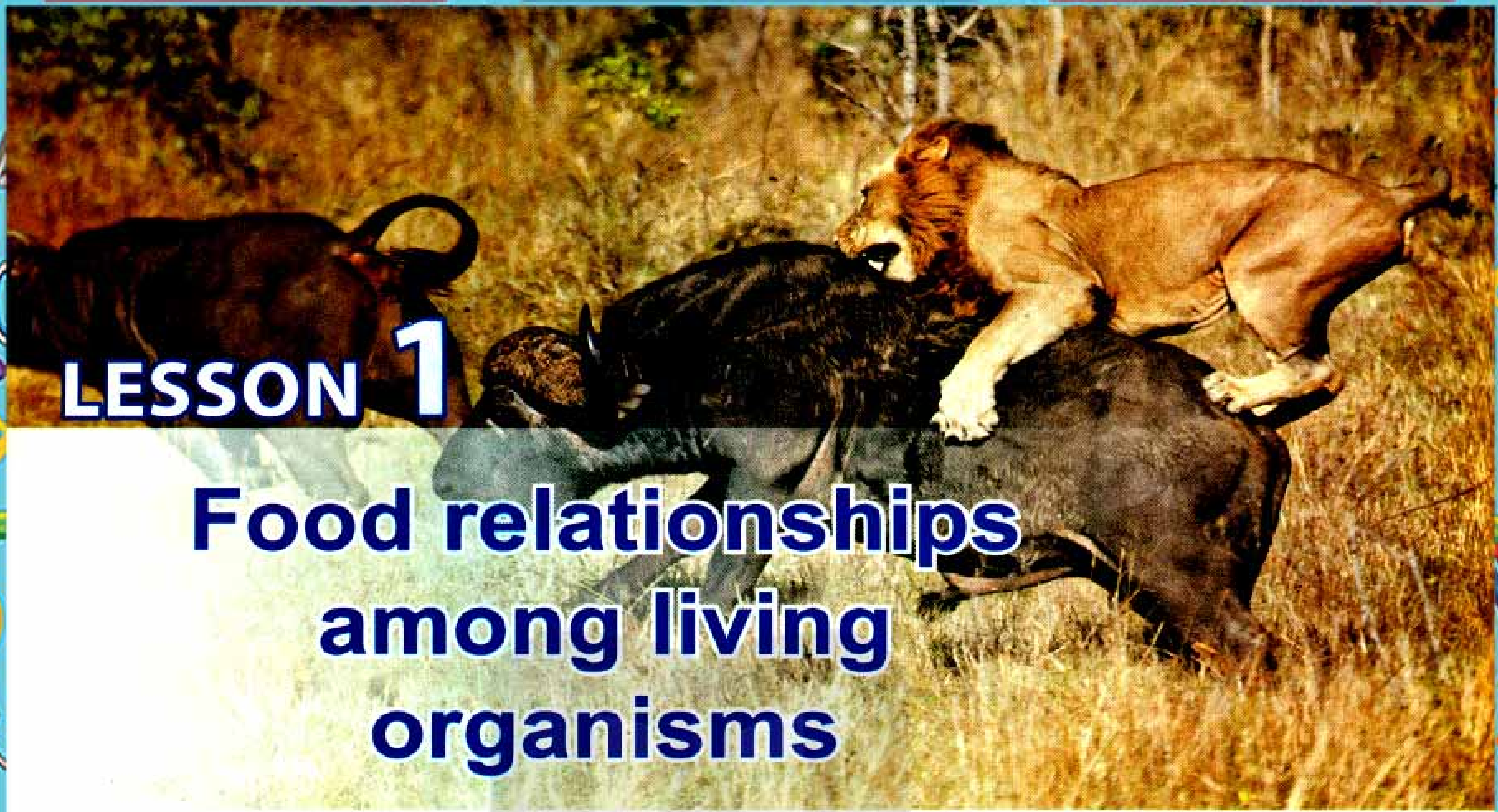
Lesson objectives:

- Identifying the food relationships among living organisms.
- Giving examples of predation in plants and animals.
- Identifying some ways of self-defence against predation in living organisms.
- Identifying examples of symbiosis among living organisms.
- Identifying examples of some parasites and their harmful effects on hosts.
- Giving examples of decomposers.

Lesson 2 Environmental balance

Lesson objectives:

- Recognizing the effect of predation on the environmental balance.
- Recognizing the effect of decomposers on the environmental balance.
- Appreciating the importance of science in our daily life



LESSON 1

Food relationships among living organisms

- Food is the main source of energy for all living organisms that face problems to get it.
- The main source of food on earth is photosynthesis process.
- Carrot is eaten by the rabbit which is eaten by the fox.

What are Food Relationships?

Carrot





Rabbit

Fox



Food relationships

- Green plants produce food from simple substances by photosynthesis process.
- Animals feed on plants in a direct way (herbivores) and in an indirect way (carnivores).
- **Types of food relationships:**
  1. Predation
  2. Symbiosis
  3. Saprophytism

main source	المصدر الرئيسى	living organisms	الكائنات الحية	face problems	يواجه المشاكل
photosynthesis	البناء الضوئى	direct way	بطريقة مباشرة	indirect way	بطريقة غير مباشرة
herbivores	آكلات العشب	carnivores	آكلات اللحوم	food relationships	العلاقات الغذائية
predation	الافتراس	symbiosis	التعايش	saprophytism	الترمم

1. Predation:

- Animals get food by attacking, killing, and devouring other living organisms.

Predation

- It is a temporary food relationship that ends by devouring the prey or a part of it.

The predator	The prey
The animal which devours another animal.	It is the devoured animal.
Ex. **Lions – tigers – wolves – sharks.**	Ex. **Deers - rabbits - rats.**

1 Predation in animals

- **Carnivores:**
  - Animals (predators) feed on other animals (preys).
  - Lions, foxes, cats and spiders are considered predators.
  - The devoured animal is considered a prey.

Ex.



A lion preys on a deer.



A fox preys on a rabbit.



A cat preys on a rat.



A spider preys on a fly.

2 Predation in plants

- **Insectivorous (insect-eaters) plants:**
  - Some plants perform photosynthesis to make carbohydrates only, but they cannot absorb other compounds from soil to make proteins.
  - They prey on tiny animals as insects. G.R.

  To get the required elements (nitrogen) to make proteins.

Ex.



Dionaea



Halophila



Drosera

attacking	هجوم	temporary	مؤقت	predator	المفترس
prey	الفريسة	prey on	يفترس	insectivorous	آكل الحشرات
carbohydrates	كربوهيدرات (نشويات)	absorb	يمتص	halophila	حامول الماء
killing	قتل	devouring	التهام		

G.R.

1. Predation is less common between plants than between animals.

Because plants are autotrophic (self-feeders) organisms as they perform photosynthesis process.

2. Predation is a temporary relationship not a permanent relationship.

Because it ends by devouring the prey or a part of it.

Self-defence methods against predation

Watch Video

- Many living organisms have different ways to defend themselves against predators or enemies such as:

1 Camouflage

Definition

- A phenomenon by which a living organism can change its color to simulate the colors of the environment where it lives to hide from enemies.

Aim To hide from their enemies.

Ex.



A butterfly simulates the color of the tree.



Some frogs can simulate the color of leaves.



A chameleon simulates the color of the surrounding environment.



A cuttlefish (Sepia) ejects a black colored fluid in water to hide from enemies.

2 Mimicry

Definition

- A phenomenon by which harmless living organisms imitate other kinds of harmful or poisonous living organisms to frighten their enemies.

Aim To frighten their enemies.

Ex.



G.R. **Some bees look like wasps by forming lines on their bodies.**

To escape from enemies that feed on the bees as those enemies fear wasps.

Try to solve Worksheet 13 Page 53

autotrophic	ذاتي التغذية	permanent	دائم	self-defence	دفاع عن النفس
imitate	يقلد	camouflage	خداع / تمويه	simulate	يقلد / يحاكى
mimicry	تنكر	cuttlefish (sepia)	حبار	eject	يقذف
harmless	غير ضار	poisonous	سام		

2. Symbiosis:

Symbiosis

- It is a common food relationship between two different types of living organisms. One benefits from the other and does not harm it (commensalism), while the other may benefit (mutualism) or is harmed (parasitism).

Do you know?

The mutual benefits
Some types of bacteria live inside man's intestine, and change some food remains into vitamin (B), while the human body provides it with food and shelter.

- **Types of symbiosis:**

Watch Video

(A) Mutualism (B) Commensalism (C) Parasitism

A Mutualism

Definition

- It is a food relationship between two living organisms where both get benefits.

Ex.

- **Nodular bacteria and leguminous plants such as beans:**
  - Bacteria fix nitrogen in an inorganic form to provide the plant with it.
  - Bacteria benefit from sugars which are made by plants during photosynthesis.



Nodular bacteria on roots of beans.

B Commensalism

Definition

- It is a superficial food relationship between two living organisms where one of them benefits from the other, while the other neither gets benefit nor is harmed.

Ex.

- **The relationship between tiny aquatic organisms and the sponge:**
  - Tiny aquatic organisms get shelter and food from the canals and fissures of a sponge which neither gets benefits nor is harmed.



Fish hide in sponge.

benefit	يستفيد	harm	يؤذى	mutualism	تبادل المنفعة
commensalism	الإفادة	parasitism	التطفل	shelter	مأوى
nodular bacteria	بكتيريا عقدية	leguminous	بقوليات	inorganic	غير عضوى
superficial	سطحى	aquatic	مائى	sponge	الإسفنج
canals	قنوات	fissures	شقوق		

Benchmark
Selected from Previous Exams

(Guide Answers: P. 12)

1 Complete the following:

1. Interaction between a cat and rat is considered as an example of .... relationship. *(Giza L.S 2016 / Dakahlia Elwady 2015)*
2. A .... ejects a black fluid in water to hide from enemies. *(Cairo, Alagoza 2016)*
3. .... is a temporary relationship. *(Giza, Omrania 2015)*
4. Insectivorous plants prey on insects to get .... *(Cairo, Heliopolis 2015)*

2 Choose the correct answer:

1. The .... can simulate the color of the surrounding environment. *(Cairo, Rod El-Farag 2016)*
   a. chameleon b. cuttlefish c. bee
2. The relation between lion and deer is .... *(Giza 2016 / Cairo 2017)*
   a. mutualism b. predation c. parasitism
3. One of the ways of self-defense (protection) against predation in living organisms is .... *(Cairo Exp. L.S. 2015)*
   a. mutualism b. symbiosis c. camouflage
4. The animal that devours other animals is called a .... *(Menofia, Quesina L.S. 2016)*
   a. host b. predator c. prey

3 Write the scientific term:

1. A temporary relationship that ends by devouring the prey or a part of it. *(Cairo Experimental L.S. 2016)* (..............................)
2. Plants that devour insects. *(Alex 2016 / Cairo 2017)* (..............................)
3. The food relation between a lion and a goat. *(Cairo Educational Directorate 2016)* (..............................)
4. The food relationship in which both organisms benefit from each other. *(Giza 2015 / Cairo 2017)* (..............................)

4 Give a reason for each of the following:

1. Some plants eat tiny insects. *(Gharbia 2016)*

   ....
2. Some living organisms take the color of the surrounding environment. *(Qalubia 2016 / Giza 2017)*

   ....
3. Predation is a temporary relationship. *(Sohag 2015)*

   ....

C Parasitism

▶ It is a food relationship between two different kinds of living organisms where one benefits from the other (known as a parasite) and the other one is harmed (known as a host).

- The parasite depends entirely on the host to get its food requirements.
- This relation causes weakness and feebleness to the host, but it does not kill it.
- The parasite may transfer (convey) diseases to the host.

Do you know?

- Some dogs, cats and birds which we have at home can be hurt by worms and some of these worms can infect humans.
- For protection follow the proper way of cleaning and visit the veterinaries regularly.

▶ Types of parasitism:

1 External parasitism

Definition

▶ Parasites live externally on the host's body and feed by sucking its blood.

Ex.



Jawless lamprey sucks fish's blood.



A mosquito sucks man's blood.

- Lice, bugs, mosquito, fleas and jawless lamprey, etc.

2 Internal parasitism

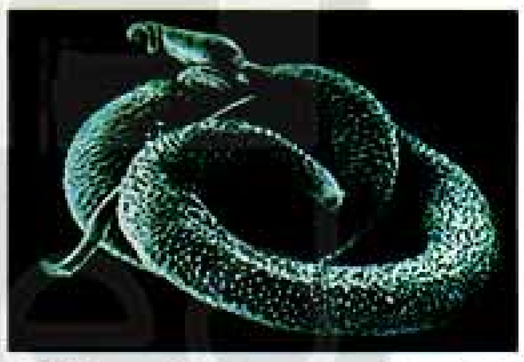
Definition

▶ Parasites live inside the host's body and share with the host its digested food or feed on its tissues and cells.

Ex.



Ascaris worms inside human's intestine



Bilharzia worms inside human's blood

- Liver worms, ascaris worms, bilharzia worms and tapeworms, etc.

G.R. **Death of the host is considered a loss to the parasite.**
Because the host is the source of food and shelter for the parasite.

parasite	طفيل	host	عائل	food requirements	متطلبات غذائية
feebleness	ضَعف	transfer diseases	ينقل الأمراض	external	خارجى
sucking	امتصاص	jawless	عديمة الفكوك	lice	القمل
bugs	البق	internal	داخلى	share	يشارك
tissues	الأنسجة	liver worms	ديدان كبدية	tapeworms	ديدان شريطية

Harmful effects of parasitism:

1. **Filarial worm causes elephantiasis disease.**



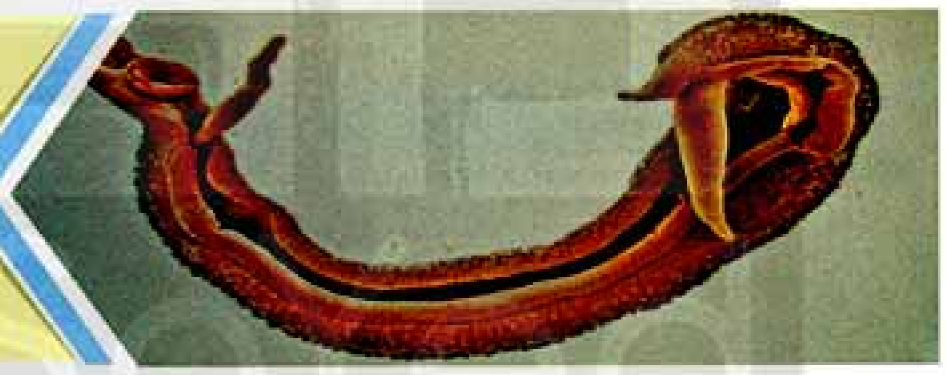
2. **Some types of mosquitoes cause malaria disease.**



3. **Some types of fleas convey smallpox* disease to man.**



4. **Bilharzia worm causes bilharziasis disease.**



5. **Ascaris worms cause anemia.**



filarial worm	دودة (خيطية) الفلاريا	elephantiasis	مرض قدم الفيل	mosquitoes	ناموس
malaria	مرض الملاريا	convey	تنقل	smallpox	الجدرى
bilharzia	البلهارسيا	bilharziasis	مرض البلهارسيا	ascaris worms	ديدان الإسكارس
anemia	أنيميا (فقر الدم)	fleas	البراغيث	plague	الطاعون

* International scientific resources mentioned that the fleas convey plague disease to man.

3. Saprophytism:

Saprophytism

- It is a food relationship in which the decomposers (saprophytes) get their food by decomposing food remains or bodies of dead organisms.

Activity To show saprophytism:

Materials Water – a slice of bread – a plastic sac.

Steps	Illustration	Observation
(1) Splash some water drops on the slice of bread. (2) Put the wet bread in the plastic sac and close it firmly in a quite dark place for two weeks. (3) Observe the bread daily without opening the sac or inhaling the air inside and wash your hands after doing the activity.		A dark green layer is formed on the bread, so the bread becomes rotten. Try to solve Worksheet 14 Page 55

Conclusion

Saprophytic organisms such as bread mold get their food by decomposing food remains.

Ex.

Mushroom fungus	Bread mold fungus	Penicillium fungus on an orange
		

G.R. **Bread mold fungus is a saprophytic organism.**
Because it gets its food by decomposing food remains (moist bread).

saprophytism	الترمم	decomposers	المحللات	firmly	بإحكام
rotten	عفن	inhaling	دخول	moist bread	خبز رطب
bread mold	عفن الخبز	mushroom fungus	فطر عيش الغراب	penicillium fungus	فطر البنسيليوم

Brief

Food relationships:

1. Predation

- It is a temporary food relationship that ends by devouring the prey or a part of it.

Self-defence methods against predation:

A. Camouflage. **B.** Mimicry

2. Symbiosis

- It is a common food relationship between two different types of living organisms. One benefits from the other and does not harm it (commensalism), while the other may benefit (mutualism) or is harmed (parasitism).

Types of symbiosis:

A *Mutualism:*

It is a food relationship between two living organisms where both get benefits.

Such as: Nodular bacteria and leguminous plants.

B *Commensalism:*

It is a superficial food relationship between two living organisms in which one of them benefits, while the other neither gets benefit nor is harmed.

Such as: The relation between tiny aquatic organism and the sponge.

C *Parasitism:*

It is a food relationship between two different kinds of living organisms, one benefits from the other (known as a parasite) and the other is harmed (known as a host).

Types of parasitism

External parasitism	Internal parasitism
Such as: Lice, bugs, mosquito, fleas and jawless lamprey.	**Such as:** Liver worms, ascaris worms, bilharzia worms and tapeworms.

3. Saprophytism

- It is a food relationship in which the decomposers (saprophytes) get their food by decomposing food remains or bodies of dead organisms.

Such as: Mushroom fungus - bread mold fungus - penicillium fungus.

Exercises on Lesson 1

Guide Answers P. 12

Solve Ex.

1 Choose the correct answer:

1. Green plants are considered .... organisms. *(Sharkia, Dokki, G.L.S 2016)*
   a. decomposer b. producer c. consumer d. parasite
2. Plants get energy from ....
   a. oxygen b. chlorophyll c. sunlight d. carbon dioxide
3. The process of photosynthesis is performed by .... living organisms.
   a. producer b. decomposer c. consumer d. parasite
4. The animal which devours another one is called a .... *(Cairo 2015)*
   a. parasite b. host c. prey d. predator
5. The devoured animal is known as a ....
   a. saprophyte b. parasite c. prey d. predator
6. Predation is a .... relationship between the predator and the prey.
   a. cautious b. temporary c. permanent d. strong
7. The relationship between lion and deer is .... *(Dakahlia 2016)*
   a. predation b. saprophytism c. mutualism d. commensalism
8. .... is an insect-eater plant. *(Cairo 2017)*
   a. Drosera b. Ascaris c. Bilharzia d. Mushroom
9. Halophila preys on some insects to get the required elements for making ....
   a. carbohydrates b. starch c. fats d. proteins
10. .... are ways of self-defence against predation.
    a. Commensalism and symbiosis b. Saprophytes and parasitism
    c. Camouflage and mimicry d. Camouflage and symbiosis
11. The .... can simulate the color of the surrounding environment. *(Rod Elfarag 2016)*
    a. chameleon b. cuttlefish c. bee d. crocodile
12. The .... ejects a black fluid in the surrounding water when attacked by an enemy. *(G.L.S 2016)*
    a. bee b. frog c. cuttlefish d. chameleon
13. The relationship between tiny aquatic and sponge ....
    a. predation b. saprophytism c. mutualism d. commensalism

14. Parasitism is a food relationship between a parasite and a ....

a. host b. predator c. prey d. dead body

15. The jawless lamprey feeds by sucking the blood of its host which is a/an ....

a. bilharzia worm b. filarial worm c. insect d. fish

16. Nodular bacteria fix .... in an inorganic form to provide legumes with it.

a. phosphor b. sulphur c. magnesium d. nitrogen

17. The food relationship between two living organisms where both of them get benefits is ....

a. mutualism b. commensalism c. predation d. parasitism

18. All the following are internal parasites except ....

a. bilharzia worm b. filarial worm c. ascaris d. lamprey

19. All the following are external parasites except ....

a. mosquitoes b. fleas c. lamprey d. bilharzia worm

20. 📖 Bilharzia worms are considered ....

a. producers b. parasites c. decomposers d. preys

21. Mosquitoes cause .... disease. *(Alex, Gharbia 2016)*

a. malaria b. smallpox c. elephantiasis d. anemia

22. Filarial worm causes ....

a. bilharziasis b. anemia c. elephantiasis d. smallpox

23. Ascaris causes ....

a. bilharziasis b. elephantiasis c. anemia d. malaria

24. .... worm causes anemia to man. *(Basteen 2016)*

a. Ascaris b. Bilharzia c. Mosquito d. Bacteria

25. Death of the host is considered a .... for the parasite.

a. gift b. loss c. reward d. nothing

26. Fungi are considered as .... living organisms. *(Giza 2017)*

a. autotrophic b. parasites c. decomposers d. all the previous

27. .... fungus decomposes the orange fruit.

a. Mushroom b. Bread mold c. Taenia d. Penicillium

28. .... are examples of decomposers. *(Sharkia 2016)*

a. Fungi b. Rabbits c. Plants d. Lions

2 Complete the following sentences:

1. .... is the main source of energy for living organisms.
2. Green plants are considered .... as they make their food by .... from carbon dioxide and .... using sunlight energy.
3. The types of food relationships are .... , ... and ....
4. .... is a temporary relationship among living organisms where one living organism devours another one.
5. .... is the living organism that devours other living organisms. *(Cairo 2017)*
6. Predation is less common in .... world than in .... world. *(Rod El-Farag 2016)*
7. The interaction between a cat and a rat is considered an example of .... relationship.
8. The relation between nodular bacteria and plant is ....
9. The ways of self-defense against predation are .... and .... *(Nozha 2016)*
10. Insectivorous plants prey on some tiny animals such as insects to get the required elements to make ....
11. Sepia ejects a black fluid in the surrounding environment to ....
12. A .... stands on a tree with a similar color.
13. A .... changes its color to hide from enemies.
14. A .... simulates the color of the surrounding environment.
15. A .... ejects a black fluid in water to hide from enemies.
16. Some bees look like .... by forming lines on their bodies.
17. There are three types of symbiosis which are ...., ... and ....
18. The relationship between .... bacteria and legumes is ....
19. The food relationship in which both organisms get benefits from each other is known as .... *(Qalubia 2017)*
20. Some aquatic living organisms get food and shelter from .... and .... of the sponge.
21. Parasites may live externally on the hosts' bodies and feed on sucking their blood such as .... they also may live internally such as .... *(Sinai 2015)*
22. The two types of parasitism are .... and ....
23. .... causes elephantiasis.
24. Fleas convey .... disease to man.

25. Mosquitoes cause .... disease. *(El-Zeitoun 2016)*
26. 📖 Bilharzia worm hurts ...., so they are called ...., while the organism that is hurt called .... *(Gharbia 2016, Giza 2017)*
27. 📖 Bilharzia worm is internal .... *(Giza 2017)*
28. 📖 Fungi are considered .... organisms. *(E.L.S 2016 / Giza 2017)*
29. 📖 The relationship between fungi and dead organisms is an example of .... *(Sharkia 2016)*
30. .... fungus decomposes orange fruits.
31. ...., ... and penicillium are examples of saprophytes.

3 Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. The food relationships include predation and saprophytism only. ( )
2. Commensalism ends by killing the prey or a part of it. ( )
3. Plants are the main source of food on earth. ( )
4. 📖 Predation is a temporary relationship between a predator and a prey. ( )
5. Symbiosis includes commensalism and parasitism only. ( )
6. The relationship between nodular bacteria and leguminous plants is mutualism. ( )
7. 📖 Some living organisms can change their color to simulate the color of their surrounding environment to hide from enemies. ( )
8. The food relationship in which each organism benefits from the other and is not harmed is parasitism. ( )
9. In mimicry, the living organisms protect themselves by changing their color to simulate the color of the surrounding environment. ( )
10. In camouflage, harmless living organisms simulate other harmful or poisonous living organisms to frighten their enemies. ( )
11. Ascaris worm causes anemia. *(Cairo 2017)* ( )
12. Bread mold, mushroom and penicillium are saprophytes. ( )
13. In saprophytism, saprophytes feed by decomposing dead bodies. ( )
14. Saprophytism is a relationship between the predator and the prey. *(Sinai 2015)* ( )
15. The death of the host is a loss for the parasite. ( )
16. 📖 The relationship between filarial worm and man is parasitism. *(G.L.S 2016)* ( )
17. Bilharzia worm causes elephantiasis. ( )
18. The fungi that feeds on the dead organisms bodies is called saprophytes. *(Giza 2017)* ( )

4 Write the scientific term for each of the following:

1. It is the main source of energy for all living organisms. (....................)
2. Living organisms have to benefit from sunlight to produce food. (....................)
3. The temporary relationship that ends by devouring the prey or a part of it. *(Cairo, El-Mostakbal E.L.S 2016)* (....................)
4. The animal which devours another animal in a food relationship. *(Alagoza 2016)* (....................)
5. It is the devoured animal. *giza 2017* *(Giza 2017)* (....................)
6. A food relationship where animals get their food by attacking, killing and devouring other living organisms. (....................)
7. The strong living organism in a predation relationship. (....................)
8. The weak living organism in a predation relationship. (....................)
9. The living organism which depends on itself in making food. (....................)
10. The element that the insect-eater plants get from the insect's body. (....................)
11. Some plants that prey on tiny animals such as insects to get the required elements for making proteins. *(Alex, Al Zohor L.S. 2012)* (....................)
12. A phenomenon by which a living organism can change its color to simulate the color of the surrounding environment where it lives to hide from its enemies. *(Giza 2017)* (....................)
13. A phenomenon by which harmless living organisms imitate other kinds of harmful or poisonous living organisms to frighten their enemies. (....................)
14. A common relationship between two different types of living organisms, one benefits from the other and does not harm it, while the other may benefit or is harmed. (....................)
15. A relationship between two organisms in which they get benefits from each other. *(Giza, Assiut 2017)* (....................)
16. A superficial food relationship between two living organisms in which one of them benefits from the relation and does not harm the other. (....................)
17. A food relationship between two different kinds of living organisms where one benefits and the other is harmed. (....................)
18. The living organism that benefits from the other in parasitism. (....................)
19. The living organism that is harmed from the other in parasitism. (....................)
20. A food relationship in which some organisms get food by decomposing food remains or bodies of dead organisms. (....................)
21. A disease caused by a filarial worm. (....................)
22. Food relationship between leguminous plants and nodular bacteria. *(Rod El-Farag 2016)* (....................)

23. Bacteria that live on the roots of leguminous plants. (..............................)
24. The organisms that help in getting rid of dead organisms. *(Giza 2017)* (..............................)
25. A worm that causes elephantiasis to man. (..............................)
26. A living organism which ejects a black colored fluid to hide from enemies. (..............................)
27. A kind of parasite that may live on the host's body to get its food. *(Giza 2017)* (..............................)

5 Correct the underlined words:

1. Green plants are heterotrophic organisms. *(E.L.S, El-Sayda 2016)* (..............................)
2. Animals benefit from the sun to make their own food. (..............................)
3. The predation relationship is permanent. (..............................)
4. The strong organism in the predation relationship is called a prey. (..............................)
5. Camouflage, mimicry and hiding are some ways of self-defence against parasitism. (..............................)
6. Beans are from insectivorous plants. (..............................)
7. The frog ejects a black colored fluid in the surrounding water to hide from enemies. (..............................)
8. The relationship between sponge and tiny aquatic is an example of predation. (..............................)
9. Lice, ticks and mosquitoes are internal parasites. *(Cairo 2015)* (..............................)
10. Saprophytism includes mutualism. *(Giza, Omrania, El Neel 2012)* (..............................)
11. The filarial worm causes anemia disease. (..............................)
12. Some types of mosquitoes infect man with elephantiasis. (..............................)
13. The relationship between fungi and bodies of dead organisms is an example of parasitism. (..............................)
14. Saprophytic organisms feed on sucking blood of living organisms. (..............................)
15. Fungi get their food by predation. (..............................)
16. A bread mold fungus is a predator. (..............................)

6 Choose from column (B) what suits in column (A): *(Suez, Giza, Alagoza 2016)*

1.

(A)	(B)
1. Drosera	a. is an external parasite.
2. Chameleon	b. is an internal parasite.
3. Mosquito	c. is an insect-eater plant.
4. Bilharzia	d. changes its body color.

1. .... 2. .... 3. .... 4. ....

2. *(Giza 2017)*

(A)	(B)
1. Mosquito	a. causes elephantasis.
2. Filarial worm	b. conveys smallpox.
3. Bilharzia	c. causes malaria.
4. Fleas	d. Bilharziasis.
5. Ascaris worm	e. causes anemia.

1. .... 2. .... 3. .... 4. .... 5. ....

7 Give a reason for each of the following:

1. Plants are the main food for lions although lions are carnivorous.
....
2. Green plants are self-feeding organisms (autotrophic).
....
3. Predation is a temporary food relationship. *(Cairo, El-Gomhoria 2012)*
....
4. The relationship between a wolf and a rabbit is predation.
....
5. Predation is less common in the plant world than in the animal world.
....
6. Some plants eat tiny insects. *(Port said 2012/ Gharbia 2016)*
....
7. Drosera is from insectivorous plants. *(Cairo, El-Nozha, Sayda 2012)*
....
8. Bean plant does not need nitrogenous fertilizers.
....
9. A chameleon can hide from its enemies.
....
10. Some living organisms can change their colors and shapes to simulate the colors of the surrounding environment where they live.
....
11. A frog can change its color. *(Damietta, E.L.S 2012)*
....
12. A cuttlefish ejects black fluid in water when it is attacked by enemies. *(Cairo 2017)*
....

13. Some bees look like wasps by forming lines on their bodies.

....

14. The relationship between nodular bacteria and leguminous plants is called mutualism.

....

15. The relationship between the sponge and tiny aquatic living organisms is called commensalism.

....

16. Parasitism differs from predation.

....

17. A host's death is considered a loss to a parasite. *(Giza 2017)*

....

18. Mosquitoes and lice are external parasites.

....

19. A tapeworm is a parasite.

....

20. Internal parasitism is more dangerous than external parasitism.

....

21. Bread mold, mushroom and penicillium fungi are saprophytes.

....

8 What happens if ...?

1. There are no green plants.

....

2. Some bees have no lines on their bodies to be like wasps.

....

3. The host of a parasite is lost.

....

4. There are no nodular bacteria from the roots of legumes.

....

9 What is meant by ...?

1. Autotrophic organisms. ....
2. Predation. ....
3. The predator. ....
4. The prey. ....
5. Symbiosis. ....

6. Commensalism. ....
7. Saprophytes. ....
8. Mutualism. ....
9. Parasitism. ....
10. The parasite. ....
11. The host. ....
12. Camouflage. ....
13. Mimicry. ....
14. Insectivorous plants. ....

10 Cross the odd word out:

1. Sunlight – water – oxygen – canbon dioxide (..............................)
2. Deer – rabbit – rat – lion *(El-Sayda 2016)* (..............................)
3. Chameleon – butterfly – cuttlefish – halophila *(Gharbia 2016)* (..............................)
4. Bee – butterfly – bird – lion (..............................)
5. Fleas – ascaris worm – tapeworm – bilharzia worm *(Qalubia 2017)* (..............................)

11 Mention the kind of the food relationship between...:

1. A lion and a deer. *(Luxor 2015/ G.L.S, Gharbia 2016)* (..............................)
2. A cat and a rat. (..............................)
3. Drosera and insects. (..............................)
4. Nodular bacteria and beans. *(Luxor 2015)* (..............................)
5. The sponge and tiny aquatic living organisms. (..............................)
6. Jawless lamprey and fish. (..............................)
7. Lice and man. (..............................)
8. Ascaris worm and man. *(G.L.S 2016)* (..............................)
9. Bilharzia worm and man. (..............................)
10. Penicillium and orange fruit. (..............................)
11. Bread mold fungus and moist bread. (..............................)
12. Fungi and dead organisms *(Gharbia 2016)* (..............................)

12 Classify the following into internal parasites and external parasites:

(Lice, ascaris worm, liver worm, bugs, mosquitoes, tapeworm)

Internal parasite	External parasite
1.	1. ....
2.	2. ....
3.	3. ....

13 Compare between...:

1. External and internal parasites mentioning some examples.
2. Parasitism and saprophytism mentioning some examples.
3. Commensalism and predation mentioning some examples.
4. Commensalism and parasitism mentioning some examples.

14 Give the names of the parasites causing the following diseases:

1. Elephantiasis. (................................)
2. Malaria. (................................)
3. Smallpox. (................................)
4. Bilharzia. (................................)
5. Anemia. (................................)

15 Classify the following organisms into predators, parasites and decomposers.

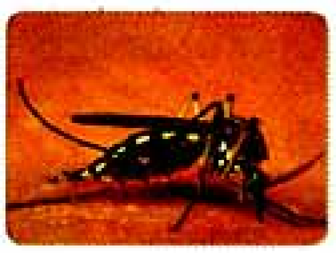
1. Bacteria. *(Giza 2016)* (................................)
2. Ascaris worm. (................................)
3. A lion. *(Giza 2016)* (................................)
4. Lice. (................................)
5. A snake. (................................)
6. Bread mold fungus. (................................)
7. Jawless lamprey. (................................)
8. Penicillium fungus. *(Giza 2016)* (................................)
9. Filarial worm. (................................)
10. Mushroom. (................................)

16 Show the food relationships in each of the following figures.


1. ....


2. ....


3. ....


4. ....


5. ....

TIMSS Like questions on Lesson 1

Guide Answers P. 14

1 **The following table shows the properties of two relationships between living organisms.**

Properties of relationship (1)	Properties of relationship (2)
- A relationship between two different kinds of living organisms. - One of them benefits and the other is harmed. - Such as the relation between tapeworms and man.	- A relationship between two different kinds of living organisms. - Both of them get benefits. - Such as the relation between nodular bacteria and leguminous plants.

Which statments about relations (1) and (2) is most likely to be correct?

a. Relation (1) is predation and relation (2) is mutualism. ☐
b. Relation (1) is parasitism and relation (2) is mutualism. ☐
c. Relation (1) is commensalism and relation (2) is predation. ☐
d. Relation (1) is parasitism and relation (2) is commensalism. ☐

2 **The relationship between tiny aquatic organisms and the sponge is commensalism. Which sentence explains that?**

a. Tiny aquatic organisms get shelter and food from sponge. ☐
b. Tiny aquatic organisms suck the blood from sponge. ☐
c. Tiny aquatic organisms get food from decomposing sponge. ☐

3 **The mosquitoes suck the blood of man.**

The relationship between them is ....

a. parasitism
b. commensalism
c. mutualism
d. predation

Mosquitoes are considered ....

	Yes	No
Host	☐	☐
Parasite	☐	☐

Explain your answer.

....

....



LESSON 2

Environmental balance

What is the Ecosystem?

Any natural area that contains living organisms and non-living things interacting together is considered an ecosystem.

Each living organism needs the other organisms to keep the balance in the environment.







The ecosystem

Watch Video

The ecosystem:

- It is a natural area that contains some living organisms (such as plants and animals) and non-living things (such as air – water – soil).

environmental	بيئى	balance	توازن	natural area	مساحة طبيعية
living organisms	كائنات حية	non-living things	أشياء غير حية	interacting	متفاعل
keep	يحافظ على	environment	بيئة	ecosystem	نظام بيئى

Watch Video

The components of ecosystem:

1. ***Non-living things such as*** **air, soil and water**
2. ***Living organisms such as*** **plants, fungi, algae and animals.**

Classification of ecosystems:

By size:

1. Small such as an area of land or a water pond.
2. Large such as a forest, a desert, or an ocean.
3. Very large such as the universe which is considered the unified ecosystem.

The relationships in an ecosystem

- There are many types of relationships in an ecosystem such as:

1. Between plants and soil:

- Plants depend on the soil to absorb water and salts to make their food by photosynthesis.



2. Between plants and animals:

- Animals feed on plants to get food and energy.

3. Between different animals:

- Some animals feed on other animals to get food and energy.

NOTE

- When all the previous relationships are in a stable state, the ecosystem is said to be a balanced ecosystem.
- Environmental balance is essential for the continuity of life in an ecosystem.

fungi	الفطريات	algae	الطحالب	forest	غابة
desert	صحراء	water pond	بركة مياه	ocean	محيط
universe	الكون	unified ecosystem	النظام البيئى الموحد	absorb	تمتص
stable state	حالة مستقرة	balanced ecosystem	نظام بيئى متوازن	continuity	استمرارية

Environmental balance

Environmental balance	Environmental imbalance
▶ It is the balance among the components of the ecosystem.	▶ It is any disturbance that affects the environmental balance.

▶ The interaction among the components of the enviroment is a continuous process to keep the balance, unless a disturbance arises as a result of changing the natural circumstances or the interference of man.

Factors that disturb the environmental balance:

1 Natural changes

▶ A change in natural circumstances (change in climate) leads to:

a. The disappearance of some organisms.

b. The appearance of other organisms.

▶ This leads to an imbalance which takes periods of time long or short until a new balance occurs.

Ex.

▶ Disappearance of huge reptiles (dinosaurs) G.R.

▶ Due to the change in natural circumstances of the environment in ancient eras which led to extinction of dinosaur.



2 Man interference

▶ Some human activities such as:

1. Cutting down trees.
2. Burning forests.
3. Polluting the environment.
4. Eroding the soil.

▶ These activities lead to the disturbance of the environmental balance.

Ex.



imbalance	عدم توازن	interaction	تفاعل	components	مكونات
disturbance	اضطراب	circumstances	ظروف	interference	تدخل
climate	مناخ	disappearance	اختفاء	appearance	ظهور
reptiles	زواحف	extinction	انقراض	cutting down trees	القطع الجائر للأشجار

Factors that keep the environmental balance:

1. ***Predation***
2. ***Saprophytism***

1. Their effects on the environmental balance:

1 Predation

1. It organizes the number of prey populations to keep the ecosystem balanced.
2. Predators get rid of weak or sick members and allow strong ones in prey populations to preserve their existence and to reproduce adding strong members to the populations.



2 Saprophytism

- As bacteria and fungi decompose dead bodies, wastes and food remains, these scavengers offer great services:
  1. These living organisms complete the food chains and webs.
  2. The recycling of the chemical elements such as carbon, nitrogen and sulphur within the ecosystem to make living organisms benefit from them.
  3. Getting rid of dead bodies, wastes and food remains.



Complete the following: Checkpoint:

1. The components of ecosystem are .... and ....
2. The ecosystem may be large as .... or small as .... or very large as ....
3. .... is the balance among the components of the ecosystem.
4. .... and .... are from the factors that harm the environmental balance.

effects	تأثيرات	population	مجتمع	preserve	تبقى
existence	وجود	reproduce	تتكاثر	wastes	فضلات
scavengers	محللات الفضلات	offer	تقديم	great services	خدمات هائلة
recycling	إعادة التدوير	getting rid of	التخلص من		

2. What happens if they are not present?

1 Predation

1. Number (population) of preys will increase to an extent that the available food resource becomes insufficient (not enough) for preys.
2. The prey will die because it has no shelter and becomes weak (feeble) and infected with diseases.

2 Saprophytism

1. The earth's surface would be covered permanently with dead bodies.
2. Many chemical elements such as carbon, nitrogen and sulphur would remain in their bodies not used by other living organisms.

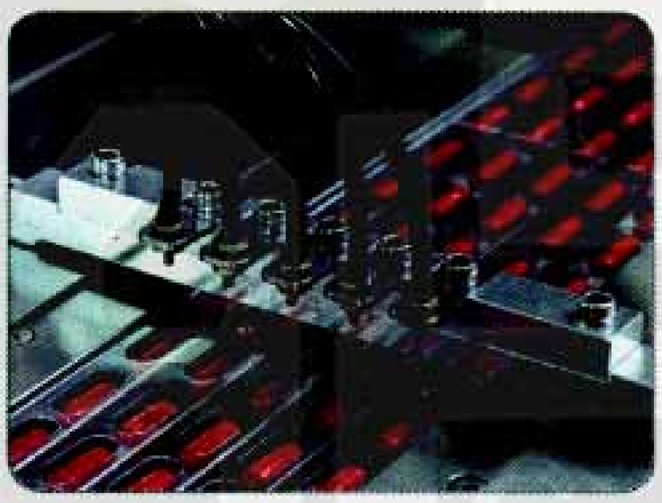
Saprophytic organisms in industry:

1 Food industry



Some saprophytes are used in making food such as: yoghurt, bread, cheese, and vinegar.

2 Drugs industry



Some saprophytes are used in the manufacturing of some medicines such as: antibiotics.

3 Leather tanning industry



Some saprophytes are used in leather tanning (dyeing) industry.

extent	حد – درجة	feeble	ضعيف	death	الموت
chemical elements	عناصر كيميائية	food industry	صناعة الغذاء	saprophytes	المحلّلات
yoghurt	الزبادى	vinegar	خل	drugs	عقاقير
manufacturing	صناعة	medicines	الأدوية	antibiotics	مضادات حيوية
leather	الجلود	tanning	دبغ	dyeing	الصباغة
food resources	مصادر الغذاء	insufficient	غير كافٍ		

Benchmark

Selected from Previous Exams

(Guide Answers: P. 14)

1 Complete the following:

1. The ecosystem contains .... and .... *(Cairo, El-Zeitoun 2016)*
2. Changing the circumstances leads to .... of the environmental balance. *(Cairo, Basteen 2016)*

2 Choose the correct answer:

- .... keeps the environmental balance. *(Cairo 2016)*
  a. Cutting forests b. Predation c. Natural change

3 Correct the underlined words:

- Water pond is a large ecosystem. *(Cairo, El-Nozha 2016)* (........................)

4 Write the scientific term:

1. Any natural area that includes living organisms and non-living organisms. *(Dakahlia 2016 / Giza 2017)* (........................)
2. Organisms which clean the earth's surface from dead bodies. *(Giza, 6th October 2016)* (........................)

5 Give a reason:

- Saprophytism keeps the ecosystem. *(Cairo 2016)*

....

6 What happens if...?

1. Trees are cut down. *(Cairo 2016)*

....

2. Bacteria disappear completely. *(Cairo 2016 / Giza 2017)*

....

7 Put (✓) or (✗):

1. An ecosystem is a natural area which contains living organisms only. *(Qena Official L.S. 2015)* (   )
2. Interaction among the environmental components leads to the imbalance of an ecosystem. *(Qena Directorate 2015)* (   )

8 What is meant by?

- Ecosystem. *(Dakahlia, Elwady L.S. 2015)*

....

Try to solve
Worksheet 15 Page 57
Worksheet 16 Page 59

Brief

▶ **The ecosystem:** It is a natural area that contains some living organisms (such as plants and animals) and non-living things (such as air - water - soil).

▶ **The components of ecosystem:**

1. Non-living things such as: air, soil and water.
2. Living organisms such as: plants, fungi, algae and animals.

▶ **Classification of ecosystems:**

By size:

1. Small such as an area of land or a water pond.
2. Large such as a forest, a desert or an ocean.
3. Very large such as the universe.

▶ **The relationships in an ecosystem:**

1. Between plants and soil.
2. Between plants and animals.
3. Between different animals.

▶ **Environmental balance:** It is the balance among the components of the ecosystem.

▶ **Environmental imbalance:** It is any disturbance that affects the environmental balance.

▶ **Factors that disturb the environmental balance:**

1. Natural changes
2. Man interference

▶ **Factors that keep the environmental balance:**

1. Predation
2. Saprophytism

▶ **Saprophytic organisms in industry:**

1. Food industry.
2. Drugs industry.
3. Leather tanning industry.

Exercises on Lesson 2

Guide Answers P. 14

Solve Ex.

1 Choose the correct answer:

1. .... keeps the environmental balance.
   a. Cutting forests b. Predation c. Natural change d. Water
2. The ecosystem contains non-living things such as ....
   a. insects b. plants c. worms d. soil
3. The ecosystem contains living organisms such as ....
   a. fungi b. soil c. air d. water
4. The disturbance in the environmental balance arises as a result of the ....
   a. balance between the number of prey populations and that of predators.
   b. soil removal c. excess food d. several ecosystems
5. The environment remains in balance due to ....
   a. the soil removal b. the environmental pollution
   c. the presence of food relationships between living organisms and non-living things
   d. burning forests
6. Among the natural changes which lead to the disappearance of some organisms is ....
   a. the change of climate b. the soil removal
   c. cutting down trees d. filling up of water pools
7. The ecosystem consists of ....
   a. living organisms b. non-living things c. all the previous d. no correct answer
8. Changing the natural circumstances leads to the disappearance of some organisms such as ....
   a. lions b. insects c. dinosaurs d. fish
9. All the following are living organisms of an ecosystem except ....
   a. insects b. plants c. air d. birds
10. All the following are components of the ocean ecosystems except ....
    a. fish b. dolphins c. deer d. shark
11. Which of the following is a very large ecosystem? ....
    a. An ocean. b. A water pond. c. A desert. d. The universe.

12. All the following are large ecosystems except the ....
    a. desert b. water pond c. forest d. sea

13. Introducing rabbits into an island that is a suitable environment with much food and no enemies will lead to ....
    a. balance b. imbalance c. equilibrium d. growth

14. Cutting down trees to build houses causes the environmental ....
    a. balance b. disturbance c. envelope d. camouflage

15. .... are considered decomposers.
    a. Fungi b. Rabbits c. Plants d. Lions

16. After the occurrence of the environmental imbalance for a long or short period of time, a new .... takes places.
    a. disturbance b. imbalance c. balance d. change

17. In the ancient eras, ... led to the extinction of dinosaurs.
    a. the appearance of new organisms
    b. the disappearance of organisms
    c. man interference
    d. the changing of natural circumstances

18. Predation .... the number of preys in a population.
    a. increases b. organizes c. decreases d. prevents

19. If there are no predators, prey populations would ....
    a. increase in number
    b. become weak
    c. die
    d. all the previous

20. Due to the shortage of food resources, ... appears among prey populations.
    a. predation b. symbiosis c. competition d. mutualism

21. Saprophytic organisms .... the chemical elements within the ecosystem.
    a. provide b. save c. keep d. recycle

22. Without the saprophytic organisms, the earth's surface would be covered by ....
    a. plants b. animals c. living organisms d. dead bodies

2 Complete the following sentences:

1. The ecosystem contains .... and .... *(Cairo 2016 / Giza 2017)*
2. The disturbance of the environmental balance arises as a result of .... and ....
3. Among man's activities which lead to the change of the environmental balance are .... and ....

4. The ecosystems may be small such as .... or large such as .... or very large such as ....
5. The balance between the components of an ecosystem is called ....
6. The disturbance produced by changing the natural circumstances of the ecosystem may cause .... and ....
7. .... is a food relationship that organizes the number of prey populations.
8. The disappearance of predation in an ecosystem causes the increase of .... and .... becomes insufficient.
9. Predators help preys in getting rid of .... or .... members.
10. Changing the circumstances leads to .... of the environmental balance. *(Basteen 2016)*
11. Bodies of living organisms contain some chemical elements such as ...., ... and .... that return to the environment with the help of .... organisms.

3 Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. Dinosaurs are examples of extinct animals due to the changing of the natural conditions in the environment. *(Cairo 2017)* (   )
2. If any type of living organisms stops reproduction process, this leads to a stable count of individuals. (   )
3. Decreasing food leads to changes in the environmental balance. (   )
4. Getting rid of owls helps in increasing the numbers of rats. (   )
5. Air and water are from the non-living things in the ecosystem. (   )
6. Predation organizes the number of prey in their populations. (   )
7. The ecosystem is a natural area containing living organisms only. (   )
8. Introducing new living organisms into a new ecosystem with much food and no enemies causes the environmental balance. (   )
9. Ecosystem may be as small as an ocean. *(Rod El-Farag 2016)* (   )
10. 📖 Interaction among the environmental components leads to the imbalance within the ecosystem. (   )
11. A new balance takes place after the occurrence of an environmental imbalance for a long or a short period of time. (   )
12. 📖 The balance of the ecosystem occurs due to man interference. (   )
13. Predation keeps the balance in the environment. *(Cairo 2016)* (   )

14. Lions are extinct animals due to a change in natural conditions. ( )
15. Saprophytes recycle chemical elements found in bodies of dead organisms. ( )
16. The environmental imbalance is due to natural changes and man interference. ( )
17. Saprophytes are the guards of nature. ( )

4 Write the scientific term for each of the following:

1. Any natural area that includes living organisms and non-living things. *(Sohag 2016 / Cairo 2017)* (..........)
2. A balance among the components of the ecosystem. (..........)
3. Organisms which clean the earth's surface from dead bodies. *(Giza, 6th of October 2016)* (..........)
4. A phenomenon that had occured to dinosaurs in ancient eras. (..........)
5. The organisms which organize the number of prey populations in the ecosystem. (..........)
6. A phenomenon that appears among prey populations due to food shortage. (..........)
7. The food relationship which helps the prey populations to get rid of weak or sick members. (..........)

5 Correct the underlined words:

1. The environmental balance is any natural area including living organisms and non-living things. (..........)
2. The interaction among the components of the environment is a stopped process. (..........)
3. The disappearance of huge birds in ancient eras due to natural changes. (..........)
4. Absence of predators increases the number of saprophytes. (..........)
5. Introducing deer to the Hawaii islands causes environmental imbalance. (..........)
6. Water pond is a large ecosystem. *(El-Nozha 2016)* (..........)

6 Give a reason for each of the following:

1. A disturbance may arise in the environmental balance.

....

2. Decomposers are considered the guards of nature. *(Giza, Omrania 2012)*

....

3. Extinction of dinosaurs in ancient ages. *(Giza, 6th October L.S. 2016)*

....

4. Saprophytism keeps the ecosystem. *(Alex 2012 / Cairo 2016)*

....

5. Plants depend on the soil.

....

6. A competition may appear among prey populations in an ecosystem.

....

7. Predators are useful for the prey populations.

....

7 What happens when ...?

1. Bacteria disappear completely. *(Giza 2012, Cairo 2017)*

....

2. Predators disappear from the environment including a few rabbits. *(Minia 2012/ Sinai 2015)*

....

3. The number of plants decreases in a food chain that consists of rats and owls.

....

4. Trees are cut down. *(Giza, 6th October 2012/ Cairo 2016)*

....

5. Saprophytes disappear from the earth. *(Alex, Borg Alarab 2012)*

....

6. Introducing rabbits to an island with much food and no natural enemies.

....

7. Natural changes in the ecosystem.

....

8 What is meant by ...?

1. The ecosystem.

....

2. The environmental balance. *(Sharkia 2016)*

....

9 **What is the effect of each of the following on the environmental balance?**

1. Saprophytism. *(Cairo 2016)*

....

2. Predation.

....

10 **Make a food chain from the following organisms:**

(snake – wheat – sheep – rat)

1. The producer in the chain is ....
2. The predator in the chain is ....
3. The herbivore in the chain is ....
4. The relationship between a snake and a rat is known as ....

11 **What happens if man kills all the snakes?** (Refer to the previous question)

....

12 **How does man benefit from saprophytic organisms in the industry?**

....

13 **Explain the absence of the organism shown in the following figure.**

....
....
....



14 **Explain what happens in case of the absence of the fox.**







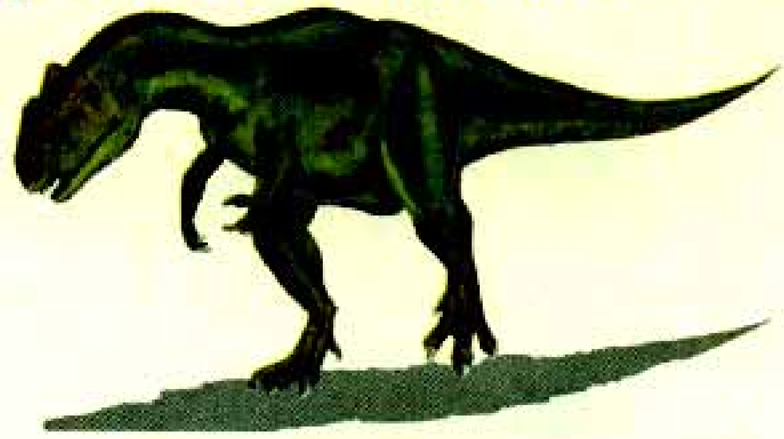
....
....
....

TIMSS Like questions on Lesson 2

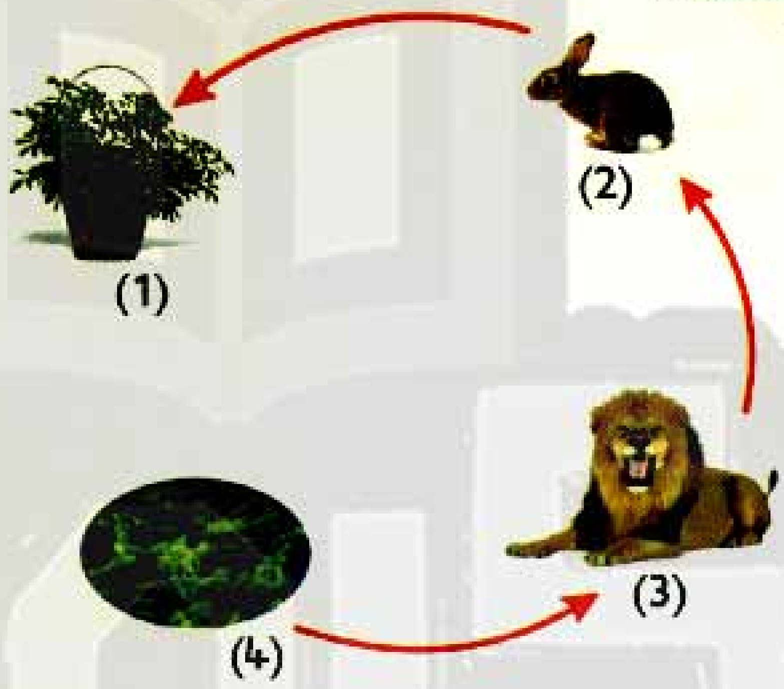
Guide Answers P. 15

1 **What is the correct explanation for the disappearance of dinosaurs?**

a. Cutting down trees.
b. Soil removal.
c. Change of circumstances (ice age)
d. Filling up of water pools.



2



a. Is the diagram representing an ecosystem? Explain your answer.

....

b. What happens if the organism (4) is absent?

....

c. What is the effect of organism (1) on the environmental balance?

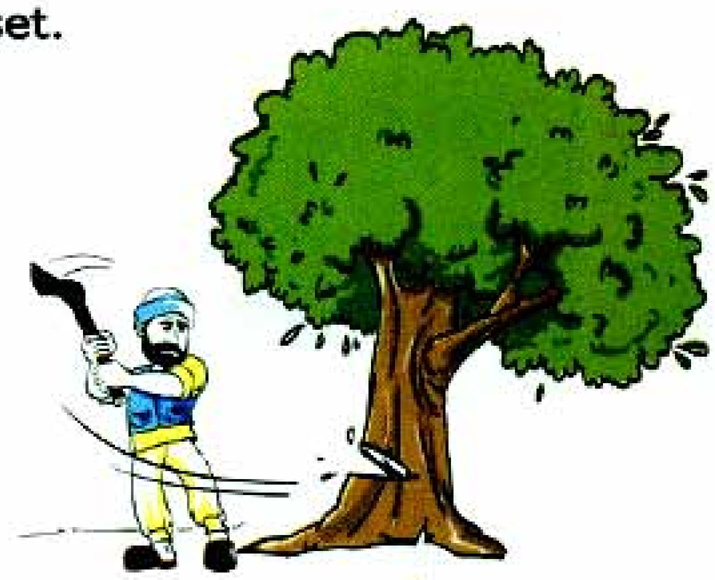
....

3 Ahmed and Ali saw a man cutting a forest tree. They felt upset. They went to him and told him not to do that because it harmed the environment.

	Yes	No
1. Do you agree with them?	☐	☐
2. Explain your answer.		

....

....



50 سنة أضواء ١٩٦٨-٢٠١٨

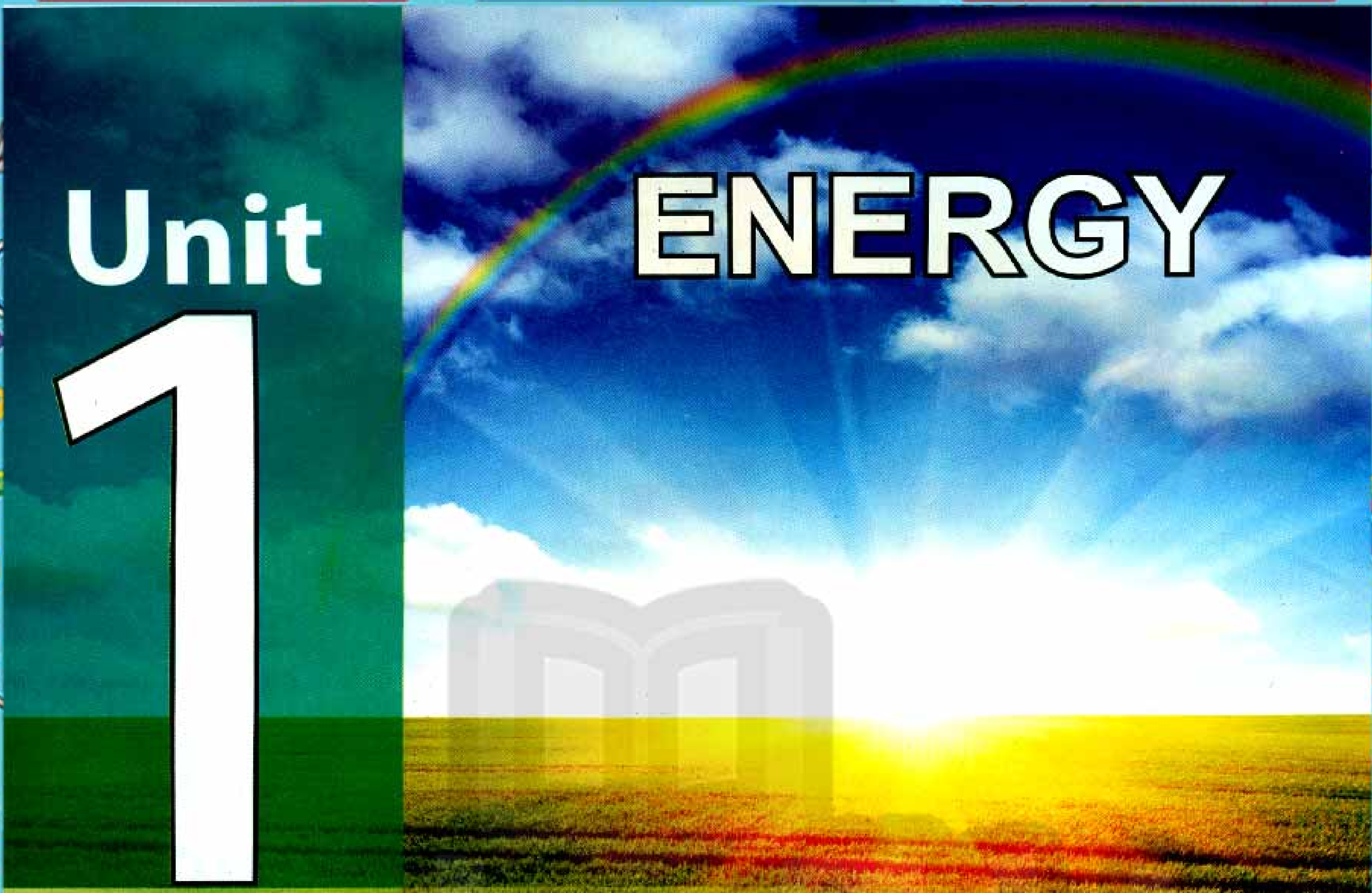
5th Prim.
FIRST TERM

SCIENCE

General & Final Revision



ALADWAA



Unit 1 ENERGY

Remember what you have learnt in this unit through the following points:

① Definitions
② Importance and uses
③ Give a reason
④ What happens if ...?
⑤ Comparisons
⑥ Main points

1. Definitions

Concept	Definition
Light	It is a form of energy that causes vision.
The visible spectrum	It is the light energy which can be seen.
Shadow	It is a darkened area that is formed when light falls on an opaque object.
Transparent materials	They are materials that allow most light to pass through and things can be seen clearly behind them.
Semi-transparent (translucent) materials	They are materials that allow some light to pass through and things can be seen less clearly behind them, compared to the transparent ones.
Opaque materials	They are materials that light cannot pass through them, and things cannot be seen behind them.
Light reflection	It is the bouncing (returning back) of light rays when they fall on a reflecting surface.
Regular reflection	It is the reflection of light when it falls on a smooth and shiny reflecting surface where light rays are reflected directly in one direction.
Irregular reflection	It is the reflection of light when it falls on a rough reflecting surface where light rays are reflected and scattered in different directions.
Light refraction	It is the change in the direction of light rays when they pass through a separating surface between two transparent media due to the change in light speed.
Separation (splitting) of light	It is the splitting of white light into seven colors called the seven spectrum colors.
Primary light colors	They are the light colors that are not produced by mixing two other light colors: (Red - Green - Blue)
Secondary light colors	They are the light colors which are produced by mixing two primary light colors: (Yellow - Cyan - Magenta).
The natural magnet	It is one of the iron ores which is a black rock and is known as magnetite.
The artificial magnet	It is a man-made magnet.

General & Final Revision

Magnetic materials	They are materials which are attracted to the magnet (iron - steel).
Non-magnetic materials	They are materials which are not attracted to the magnet (aluminum - copper).
Magnetic poles	The regions of the magnet at which most of the attraction force is concentrated.
The magnetic field	It is a region (space) around a magnet in which the effect of the magnetic force appears.
The magnetic force	It is the ability of the magnet to attract magnetic materials that exist in its field.
The compass	It is a tool that is used to identify the four main geographical directions (North - South - East - West).
The electromagnet	It is a temporary magnet which is made by the effect of electricity. Or it is a device that is used to convert electrical energy into magnetic energy.
Ammeter	A device used to measure electric current intensity.
The dynamo	It is a device that is used to convert the mechanical (kinetic) energy into electrical energy.

2. Importance and uses

Item	Importance and uses
A glass prism	• It separates the visible white light into seven spectrum colors.
White opaque objects	• They reflect all spectrum colors.
Black opaque objects	• They absorb all spectrum colors.
A magnet	• It is used to attract magnetic substances like iron, nickel, steel and cobalt. • It is used in making the electric generator (dynamo) and the compass.
A magnetic compass	• It is used to identify the four main geographical directions.

The electromagnet	• It converts electric energy into magnetic energy. • Making cranes (big-sized winches) to lift heavy iron blocks. • Making many devices such as: a. The electric bell. b. The electric mixer. c. The disc drive. d. The television.
The dynamo (the electric generator)	• It converts the kinetic energy into electric energy: 1– Using a small dynamo as in the bicycle. 2– Using a huge dynamo (electric generator). • It is used to generate large amounts of electricity in electric power stations for lightening cities and operating factories.

3. Give a reason

1. The moon is not considered as a source of light.
   - Because it reflects sunlight that falls on its surface.
2. The moon seems shiny.
   - Because the moon reflects sunlight which falls on its surface.
3. The formation of images by using narrow holes.
   - Due to the traveling of light in straight lines.
4. The formation of shadow when light falls on an opaque body.
   - Due to the traveling of light in straight lines.
5. Clear water and transparent plastic are transparent materials.
   - Because they allow most light to travel through and things can be seen clearly (in full details) behind them.
6. Things can be seen clearly behind transparent materials.
   - Because they allow most light to travel through.
7. Tissue paper is a semi-transparent (translucent) material.
   - Because it allows some light to travel through and things can be seen less clearly behind them, compared to the transparent ones.
8. Carton paper and wood are opaque materials.
   - Because they do not allow light to travel through and things cannot be seen behind them.
9. Things cannot be seen behind wood.
   - Because wood is an opaque material that does not allow light to travel through.

General & Final Revision

10. You can see your image across a mirror.
    - Due to the occurrence of the regular reflection, where light rays are reflected in one direction.
11. The pencil appears as if it was broken at the water surface in a transparent glass.
    - Because of light refraction where light speed through air is faster than that through water.
12. Refraction of light rays as soon as they transfer from air to water.
    - Because light speed in air is faster than in water.
13. The formation of the light spectrum.
    - Because on passing of white light through a glass prism, it is separated into seven spectrum colors.
14. White light can be separated.
    - Because white light is made up of seven spectrum colors and when white light passes through a glass prism, it separates into seven spectrum colors.
15. A rainbow is formed in the sky after rain.
    - Because sunlight splits into seven colors when it passes through the drops of rain water where the drops of rain act as a glass prism.
16. A green glass window appears green when a white light strikes it.
    - Because the glass absorbs all the spectrum colors and allows (permits) the green light only to pass through.
17. Transparent and translucent objects appear colored when light passes through.
    - Because they absorb all the spectrum colors and allow (permit) their own color only to transmit through.
18. An apple appears red through a red transparent glass sheet.
    - Because it absorbs all the spectrum colors of light that strike it and reflects the red color only. The reflected red color strikes the red transparent glass sheet and passes through the glass.
19. When white light strikes a transparent green glass ruler, the green color only passes through.
    - Because a transparent green ruler absorbs all light colors and allows the green color only to pass through.
20. An apple appears black through a green transparent glass sheet.
    - Because the green glass sheet does not transmit the reflected red color.
21. The strawberry fruit appears red when white light falls on it.
    - Because it absorbs all the spectrum colors that fall on it and reflects the red light only.

22. A banana fruit seems yellow when sunlight falls on it.
    - Because a banana fruit absorbs all light colors and reflects the yellow color only.
23. White opaque objects appear to be white in color.
    - Because they reflect all the spectrum colors.
24. Black opaque objects appear to be black in color.
    - Because they absorb all the spectrum colors and do not reflect any color.
25. We should wear white clothes in summer.
    - Because white clothes reflect all light colors.
26. It is preferred to wear black clothes in winter.
    - Because black clothes absorb all light colors.
27. Red, green and blue lights are known as "primary light colors".
    - Because they are not produced by mixing any other light colors.
28. Yellow, cyan and magenta colors are known as "secondary light colors".
    - Because each color is produced by mixing two primary light colors.
29. Some materials are known as magnetic materials.
    - Because they are attracted to the magnet.
30. Some materials are known as non-magnetic materials.
    - Because they are not attracted to the magnet.
31. Copper, wood and glass are considered non-magnetic materials, while iron, nickel and cobalt are considered magnetic materials.
    - Because copper, wood and glass are not attracted to the magnet, while iron, nickel and cobalt are attracted to the magnet.
32. The magnet attracts iron nails, but does not attract chalk pieces.
    - Because iron nails are magnetic materials, but chalk pieces are non-magnetic materials.
33. When you put some iron nails next to a magnet, most nails are attracted to the two poles of the magnet.
    - Because the two poles of the magnet have the most powerful force of attraction.
34. Paper clip is a magnetic substance.
    - Because it is attracted to the magnet.
35. Wood and glass are non-magnetic substances.
    - Because they are not attracted to the magnet.

General & Final Revision

36. One pole of the magnet is called "north pole (N)", while the other is called "south pole (S)".
    - Because the freely suspended magnet always takes a fixed (North-South) direction. The pole of the magnet which points to the north is called "north pole (N)", while the other one that points to the south is called "south pole (S)".
37. The two north poles repel each other, while the north pole attracts the south pole.
    - Because like magnetic poles repel each other, while unlike magnetic poles attract each other.
38. The compass is used to identify the four main geographical directions.
    - Because its north pole refers to the north direction of the Earth and its south pole refers to the south direction of the Earth.
39. When an electric current flows through a wire that is put beside a compass, its needle deflects.
    - Because the electric current has a magnetic effect where it generates a magnetic field.
40. The magnet which is made by electricity is called electromagnet.
    - Because it changes electric energy into magnetic energy.
41. It is preferable to increase the number of coil turns in the electromagnet.
    - To increase the magnetic force of the electromagnet.
42. In the electromagnet, we have to increase the number of batteries.
    - To increase the intensity of the electric current passing through the coil which increases the magnetic force of the electromagnet.
43. In the electromagnet, we use a battery with high voltage and increase the number of turns in the moving coil.
    - To increase the magnetic force.
44. In the dynamo, we use a strong magnet and increase the number of turns in the moving coils.
    - To increase the electric energy.
45. The deviation of the ammeter's pointer when moving the copper wire between the two poles of magnet.
    - Due to passing of the electric current through the copper wire.
46. The small cylinder in the bicycle's dynamo touches the bicycle's wheel tire.
    - Because when the bicycle moves, the small cylinder turns by touching the bicycle's wheel tire, so the magnet turns inside the coil and the electric current is generated causing the bicycle's bulb light.

4. What happens if ...?

1. You look at a candle light through three partition holes which are on the same straight line with the light of the candle.
   - I can see the candle light because light travels in straight lines.
2. You darken a room and put your hand between a light source and a wall.
   - Shadow is formed as light travels in straight lines.
3. You put a transparent object between a light source and a wall.
   - No shadow is formed.
4. You look at your image through a transparent material.
   - I can see my image across it clearly.
5. You look at your image through frosted glass.
   - I can see my image across less clearly compared to transparent glass.
6. You stand facing a mirror.
   - I can see my image due to the regular light reflection.
7. You look at a pencil inside a glass of water.
   - The pencil appears as if it is broken at the water surface due to light refraction because the speed of light through air is faster than that through water.
8. You let sunlight pass through a triangular prism.
   - White light is separated into seven spectrum colors.
9. The seven colors are mixed with each other.
   - White light is produced.
10. When white light strikes a red apple.
    - It seems red because it absorbs all the spectrum colors that fall on it and reflects the red light only.
11. When white light strikes a yellow glass window.
    - It seems yellow because it absorbs all the spectrum colors which fall on it and allows the yellow light only to pass through.
12. You look at a green apple through a red glass sheet.
    - The apple seems to be black.
13. When white light strikes a banana.
    - The banana absorbs all the spectrum colors and reflects the yellow light only.

General & Final Revision

14. When white light strikes a black object.
    - The black object absorbs all the spectrum colors and appears black.
15. Mixing the red and blue lights.
    - The magenta (purple) color is formed.
16. Mixing red and green lights.
    - The yellow color is formed.
17. A strong magnet is put close to a piece of nickel.
    - The piece of nickel is attracted to the magnet.
18. A strong magnet is put close to a piece of wood.
    - The piece of wood is not attracted to the magnet.

19. Paper clips are put near a bar magnet.
    - The two ends of the magnet attract a greater number of the paper clips because the areas of the magnet which have the most powerful force of attraction are the two ends which are called "the two poles".
20. A magnet is placed next to a mixture of iron nails, paper clips, glass, chalk pieces, aluminum.
    - Iron nails and paper clips are attracted to the magnet.
    - Glass, chalk pieces and aluminum are not attracted to the magnet.
21. You scatter some iron filings on a glass sheet, put a strong magnet, then knock on the glass sheet.
    - Iron filings are arranged around the magnet in a regular way and assemble at the two poles of the magnet.
22. A magnet is hung to move freely.
    - One pole of the magnet is directed towards the north direction of the earth, while the other pole is directed towards the south direction of the earth,
23. A north pole of a magnet is put next to a north pole of another one.
    - The two north poles repel each other.
24. A north pole of a magnet is put next to a south pole of another one.
    - The north pole attracts the south pole.
25. An electric current passes through a coil winding around a wrought iron bar.
    - The iron bar changes into a temporary magnet that is called "electromagnet".
26. An electric current passes through a coil winding around a wrought iron bar that is immersed in iron filings.
    - The iron bar attracts iron filings as it becomes an electromagnet.

27. An electric current passes through the coil of the electromagnet of a winch.
    - It attracts iron blocks, then moves to another place.
28. Cutting off the electric current which passes through the coil of the electromagnet of a winch.
    - The electromagnet loses its magnetic force and iron blocks fall.
29. Increasing the number of batteries in an electromagnet.
    - The magnetic force increases.
30. You move a magnet inside the coil.
    - An electric current is generated in the coil.
31. Increasing the number of turns in the moving coil in the dynamo.
    - Increases the produced amount of electricity from the dynamo.
32. Connect a copper wire with the ammeter, then put it between the two poles of a magnet.
    - The pointer of the ammeter does not deflect.
33. Connect a copper wire with the ammeter, then put it between the two poles of a magnet. Then increase the motion of the wire between the two poles of the magnet.
    - The pointer of the ammeter is deflected due to the passing of more electric current.

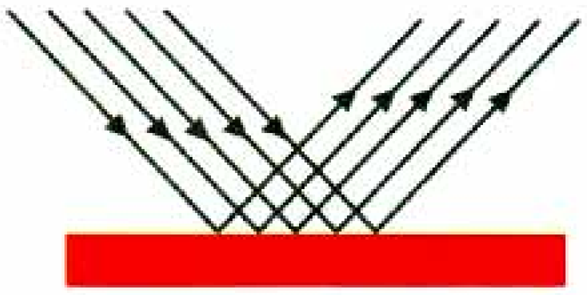
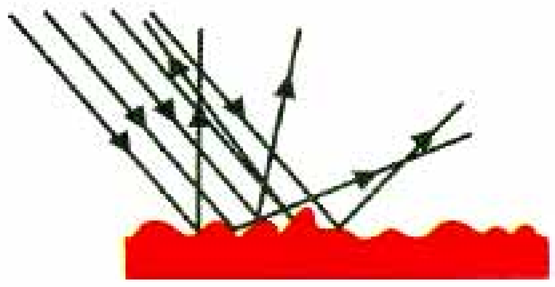
5. Comparisons

1.

Transparent materials	Semi-transparent (translucent) materials	Opaque materials
• They are the materials that allow most light to travel through and things can be seen clearly (in full details) behind them.	• They are the materials that allow some light to travel through and things can be seen less clearly behind them, compared the transparent ones.	• They are the materials that do not allow light to travel through and things cannot be seen behind them.
	Ex.	
• Glass windows. • Air. • Clear water. • Transparent plastic.	• Tissue paper. • Screen doors. • Frosted glass.	• Cardboard. • Wood. • Clay forms. • Foil.

General & Final Revision

2.

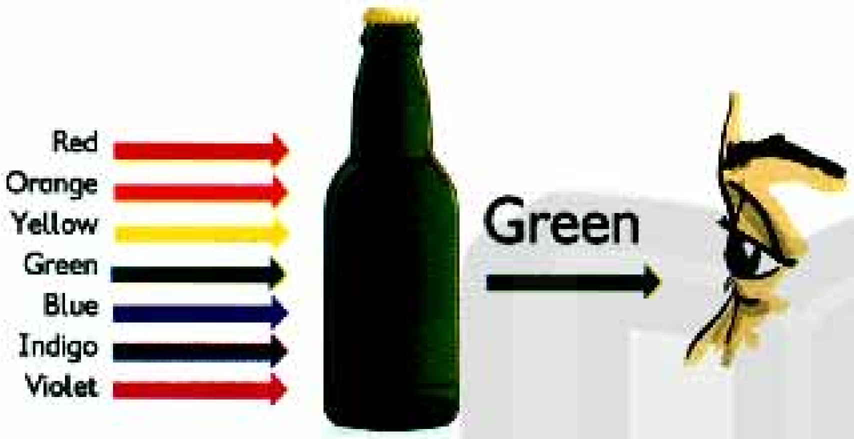
Regular reflection	Irregular reflection
• It is the reflection of light when it falls on a smooth and bright (shiny) surface.  **A smooth surface** • Light rays are reflected in one direction.	• It is the reflection of light when it falls on a rough surface (containing protrusions and tiny holes).  **A rough surface** • Light rays are reflected and scattered in different directions.
Ex.	
Reflection of light when it falls on a plane mirror.	Reflection of light when it falls on a paper.

3.

Seeing colored transparent and translucent objects	Seeing colored opaque objects
• Why does the glass bottle appear to be green? 	• Why does the banana appear to be yellow? 
Explanation: 1. When white light strikes the transparent glass bottle as shown, the glass bottle absorbs all the spectrum colors and allows (permits) the **green** light only to pass through. 2. As a result, the glass bottle appears to be **green**.	**Explanation:** 1. When white light strikes the banana as shown, the banana absorbs all the spectrum colors and reflects the **yellow** light only. 2. As a result, the banana appears to be **yellow**.

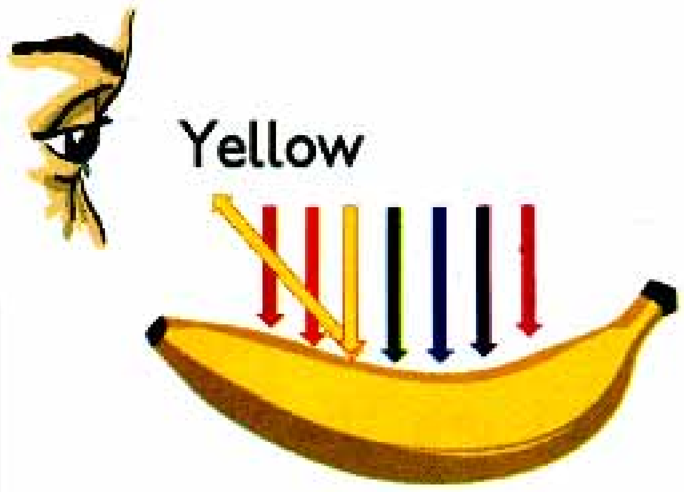
Conclusion:

- Colored transparent and translucent objects have the same colors of light passing through.

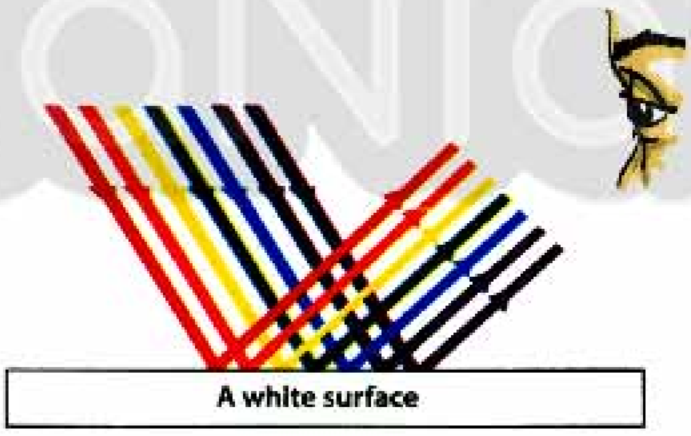


Conclusion:

- Colored opaque objects have the same colors of the reflected light.



4.

Seeing white opaque objects	Seeing black opaque objects
• When white light strikes white opaque objects as shown, these objects reflect all the spectrum colors. 	• When white light strikes black opaque objects as shown, these objects absorb all the spectrum colors and do not reflect any color. 
Ex. So, white opaque objects appear to be white (the same color of light that falls on them).	Ex. So, black opaque objects appear to be black.

General & Final Revision

5.

Primary light colors	Secondary light colors
• They are the light colors that are not produced by mixing two other light colors.	• They are light colors that are produced by mixing two primary light colors.
Ex. Red, green and blue.	Ex. Yellow, magenta and cyan.

6.

Magnetic materials	Non-magnetic materials
• They are the materials which are attracted to the magnet.	• They are the materials which are not attracted to the magnet.
Ex. Iron – steel – cobalt – nickel.	Ex. Paper – glass – wood – plastic – chalk – aluminum – copper.

7.

Electromagnet	Dynamo
Structure: • A copper wire coiling around a bar of wrought iron and this wire is connected to a battery. • It converts electric energy into magnetic energy.	**Structure:** • A copper coil and a magnet. • It converts the mechanical energy into electric energy.
Uses: • It is used to make big-sized winches (cranes) to lift heavy iron blocks in factories. • Making many devices such as: a. The electric bell. b. The electric mixer. c. The disc drive. d. The television.	**Uses:** • It generates a large amount of electricity that is used for lightening cities and operating factories.

6. Main points

1. The sun is the main light source on the earth's surface.
2. The light energy which can be seen is called the visible spectrum.
3. Lamps, candles and kerosene lamps are from the artificial sources of light.
4. Traveling of light in straight lines causes some phenomena such as:
   (a) The formation of images by using narrow holes.
   (b) The formation of shadow.
5. The idea of the photographic camera is based on the idea of the formation of images by using narrow holes.
6. As an object approaches a light source, the shadow area increases and vice versa. Therefore, the nearer an object to a light source, the bigger the object's shadow becomes.
7. Mixing the spectrum colors produces the visible white light.
8. The visible white light is made up of seven spectrum colors.
9. Colored transparent and translucent objects have the same colors of the transmitted light through.
10. Colored opaque objects have the same colors of light they reflect.
11. An opaque object is seen in its original color when you see it through a transparent object that has the same color.
12. The materials that are attracted to the magnet are called "magnetic materials".
13. The materials that are not attracted to the magnet are called "non-magnetic materials".
14. The areas of the magnet which have the most powerful force of attraction are the two ends which are called "the two poles of the magnet".
15. To differentiate between the two poles of the magnet, the north pole is colored in red, while the south pole is colored in blue.
16. Like magnetic poles repel each other, while unlike magnetic poles attract each other.
17. A magnet loses its magnetic properties by heating or hammering.
18. The magnetic field around the magnet has a regular shape.
19. The most powerful magnetic force of a magnet is at its poles.
20. The magnetic needle of the compass refers to the north and south directions of the earth.



Unit 2 MIXTURES

Remember what you have learnt in this unit through the following points:

① Definitions
② Give a reason
③ What happens if ...?
④ Comparisons
⑤ Diagrams
⑥ Main points

1. Definitions

Concept	Definition
A pure substance	It is the substance that is made up of only one type of identical particles.
A mixture	It is the substance that consists of more than one type of particles.
A solid-solid mixture	The mixture that consists of two or more different solid materials.
A liquid-liquid mixture	The mixture that consists of two or more different liquids.
A solid-liquid mixture	The mixture that consists of solid and liquid matter.
A gaseous-gaseous mixture	The mixture that consists of different gases.
A gaseous-liquid mixture	The mixture that consists of gas and liquid matter.
Homogeneous mixtures	Mixtures whose components cannot be distinguished (milk).
Heterogeneous mixtures	Mixtures whose components can be distinguished (sand and water mixture).
A solvent	It is the substance in which a solute disappears (dissolves).
A solute	It is the substance which dissolves in the solvent.
A solution	It is a homogeneous mixture in which the solute breaks down into its most basic particles that spread throughout the solvent.
Solubility process	It is the process by which a solute dissolves in a solvent leading to the disappearance of the solute.
Soluble substance	It is the substance that dissolves in a solvent.
Insoluble substance	It is the substance that does not dissolve in a solvent.
Suspension	It is a heterogeneous liquid mixture in which the particles of the solute are suspended through the solvent and can be separated by filtration process.

2. Give a reason

1. Both distilled water and salt are pure substances.
   - Because each one consists of only one type of identical particles.
2. Milk and tomato sauce are mixtures.
   - Because each one consists of more than one type of particles.
3. Concrete is considered a mixture.
   - Because it consists of more than one type of particles.

General & Final Revision

4. Mineral water is considered a mixture.
   - Because it consists of more than one type of particles.
5. Air is considered a gaseous-gaseous mixture.
   - Because it consists of different gases such as nitrogen, oxygen and carbon dioxide.
6. Table salt can be separated from sea water.
   - Because by evaporation process of sea water, water evaporates and salt remains.
7. Iron filings can be separated easily from sand.
   - Because a magnet attracts iron filings and separates them from sand.
8. A heterogeneous mixture is formed by adding sand to water.
   - Because sand is an insoluble substance in water.
9. A solution is a type of mixture.
   - Because it consists of more than one type of particles.
10. Sea water and sugary solutions are homogeneous liquid mixtures.
    - Because the components of each of them cannot be distinguished from each other.
11. Chalk in water is a heterogeneous mixture.
    - Because the particles of chalk can be distinguished from water.
12. Water is considered a common solvent.
    - Because a lot of solid materials dissolve in it.
13. The solubility speed depends on the temperature of the solution.
    - Because when the temperature of the solution increases, the time of solubility decreases.
14. Dissolving sodium chloride in water is faster than dissolving sodium carbonate in the same amount of water.
    - Because the solubility speed depends on the kind of the solute.
15. Dissolving 10 g of sodium chloride in 500 ml of water is faster than dissolving 100 g of sodium chloride in the same amount of water.
    - Because when the amount of the solute increases, the solubility speed decreases.
16. Dissolving sugar in hot water is faster than in cold water.
    - Because when the temperature increases, the solubility speed increases.
17. Powdered sugar dissolves in water faster than cubes of sugar.
    - Because when the surface area of sugar increases, the solubility increases.
18. The solubility speed depends on the temperature of the solution.
    - Because when the temperature of the solution increases, the speed of solubility increases.
19. A large amount of salt hardly and slowly dissolves in small amounts of water.
    - Because when the amount of solute increases, the solubility time increases.

3. What happens if ...?

1. Stirring an amount of salt in water.
   - A homogeneous mixture of salty water is formed.
2. Adding an amount of oil to an amount of water.
   - Oil does not mix with water and forms a layer over it (liquid-liquid mixture).
3. Grinding pepper with salt.
   - A solid-solid mixture is formed.
4. Carbon dioxide gas passes through a sugary solution.
   - Carbon dioxide dissolves in the sugary solution producing soda water (a gaseous-liquid mixture).
5. Stirring a mixture of sugar and water.
   - The solubility speed increases.
6. Salty water is left for a long time.
   - Water evaporates leaving the salt.
7. Putting a magnet next to a mixture of iron filings and flour.
   - Iron filings are attracted to the magnet.
8. Adding sand to water.
   - Sand is an insoluble substance in water, so a heterogeneous mixture is formed and it is called a suspension.
9. Stirring two unequal amounts of salt in two beakers that contain equal amounts of water.
   - The solubility time of salt in the beaker that contains a large amount of water decreases, while the other beaker increases.
10. The amount of a solvent increases.
    - The solubility speed increases, while solubility time decreases.
11. The amount of a solute increases.
    - The solubility speed decreases, while solubility time increases.
12. The temperature of a solvent increases.
    - The solubility speed increases.
13. The temperature of a solvent decreases.
    - The solubility speed decreases (solubility time increases).

4. Comparisons

1.

Pure substance	Mixture	Solution
• It is the substance that consists of only one type of identical particles.	• It is the substance that consists of more than one type of particles.	• It is a type of mixture that consists of a solute that dissolves (disappears) in a solvent.
Ex. **Baking soda.**	**Fruit salad.**	**Salty water.**

2.

Homogeneous mixture	Heterogeneous mixture
• Its components cannot be distinguished from each other.	• Its components can be distinguished from each other.
Ex. **– Salty water.** **– Sugary solutions.**	**– Sand in water.** **– Mud in water.**

3.

Solvent	Solute
• It is the liquid substance in which a solute dissolves.	• It is the substance that dissolves (disappears) in a solvent.
Ex. **– Water in salty solutions.** **– Alcohol – benzene.**	**– Salt in salty water.** **– Sugar in sugary solutions.**

5. Diagrams

Formation of mixtures

- **Shaking process** — Used to form → Solid-solid, liquid-liquid & solid-liquid mixtures
- **Stirring process** — Used to form → Liquid-liquid & solid-liquid mixtures
- **Grinding process** — Used to form → Solid-solid mixtures

Separation of mixtures

A magnet (the magnetic attraction)	A filter paper (filtration process)	Evaporation process	Separating funnel
Used to separate	Used to separate	Used to separate	Used to separate
Solid-solid mixtures containing magnetic materials.	Solid materials that are insoluble in water.	Some soluble solid materials from water.	Heterogeneous liquid mixtures.
Ex. Iron filings from sand.	Ex. Sand from water.	Ex. Salt from sea water.	Ex. Oil-water mixtures.

Ex.

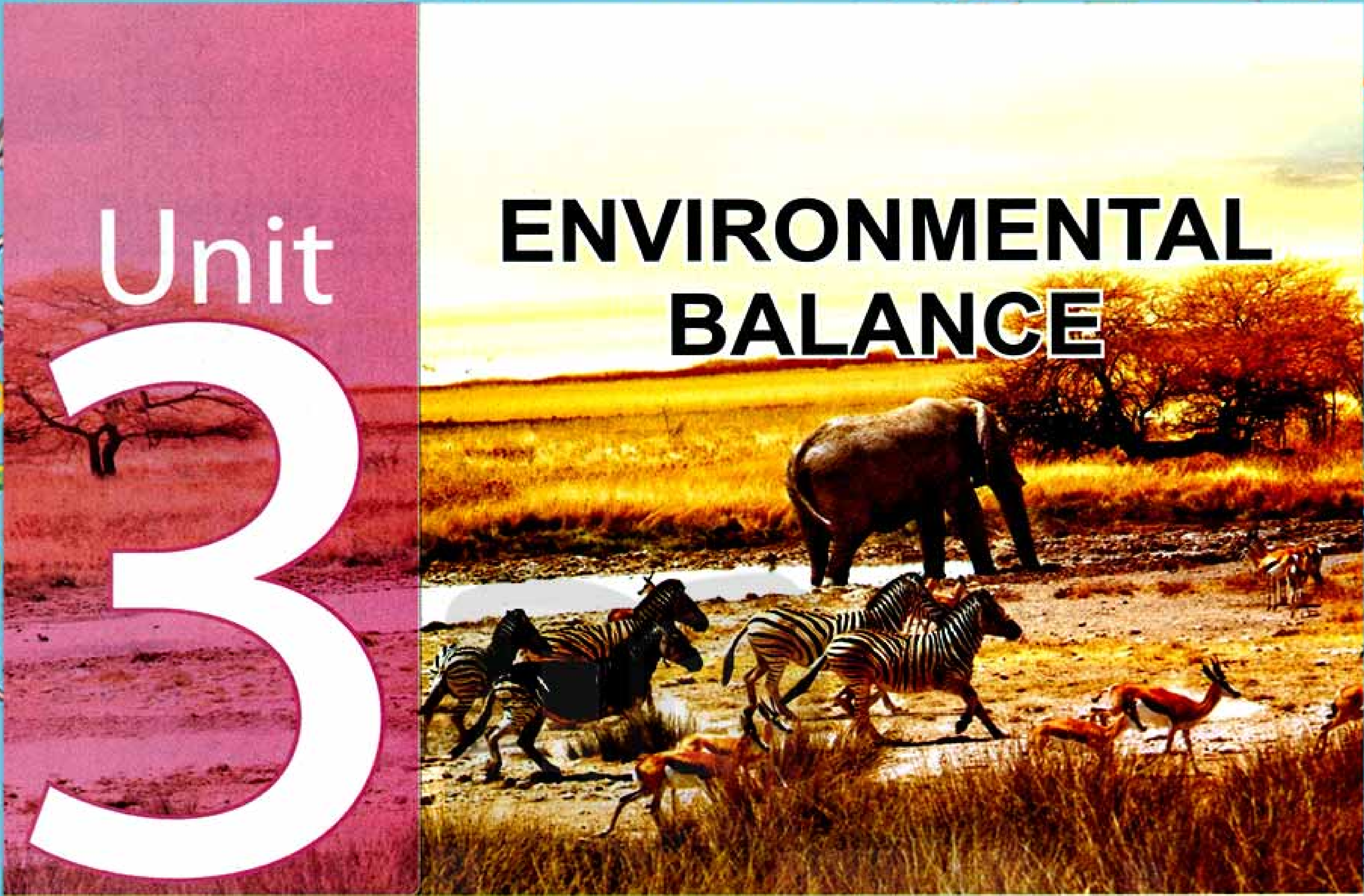
Substances	Mixtures	Methods of separation
Iron filings	Iron-wood mixtures	A magnet
Salt	Salty solutions	Evaporation process
Oil	Oil-water mixtures	Separating funnel
Sand	Water-sand mixtures	A filter paper (Filtration process)

6. Main points

1. **Mixtures consist of more than one type of particles.**
2. **Properties of mixtures:**
   - Their components do not react with each other and can be separated easily.
   - Each component keeps its own properties.
   - Their components can be mixed by any ratio.
3. **Methods of formation of mixtures:**
   - Shaking
   - Stirring
   - Grinding
4. **Methods of separation of mixtures:**
   - Magnetic attraction
   - Filtration process
   - Evaporation process
   - Separating funnel
5. **The factors that affect solubility process:**
   - Quantity of a solvent and a solute.
   - Temperature.
   - Stirring.
   - The kind of the solute.

Unit 3

ENVIRONMENTAL BALANCE



Remember what you have learnt in this unit through the following points:

① Definitions
② Importance and uses
③ Give a reason
④ What happens if ...?
⑤ Comparisons
⑥ Diagrams
⑦ Important labels
⑧ Main points

1. Definitions

Concept	Definition
Predation	It is a temporary food relationship that ends by the devouring of the prey or a part of it.
A predator	The animal which devours another animal.
A prey	It is the devoured animal.
Camouflage	It is a phenomenon in which a living organism can change its color to simulate the colors of its surrounding environment to hide from enemies.
Mimicry	It is a phenomenon in which harmless living organisms imitate other kinds of harmful or poisonous living organisms to frighten their enemies.
Symbiosis	It is a common food relationship between two different types of living organisms where one benefits from the other and does not harm it, while the other may benefit or is harmed.
Mutualism	It is a food relationship between two living organisms and both get benefits.
Commensalism	It is a superficial food relationship between two living organisms where one of them benefits from the other, while the other neither gets benefit nor is harmed.
Parasitism	It is a food relationship between two different kinds of living organisms where one benefits from the other, while the other one is harmed.
The parasite	The living organism in parasitism which gets benefits from the other.
The host	The living organism in parasitism which is harmed.
External parasitism	It is a food relationship in which the parasite lives externally on the host's body and feeds by sucking blood of the host and conveys diseases to it.

General & Final Revision

Internal parasitism	It is a food relationship in which the parasite lives internally inside the host's body and shares the host's digested food or feeds on its tissues and cells.
Saprophytism	It is a food relationship in which the saprophytes (decomposers) get their food by decomposing food remains or bodies of dead organisms.
The ecosystem	It is a natural area that contains some living organisms (such as plants and animals) and non-living things (such as air - water - soil).
The environmental balance	It is the balance among the components of the ecosystem.
The environmental imbalance	It is any disturbance that affects the environmental balance.

2. Importance and uses

1. Predation relationship:

1. It organizes the numbers of prey populations to keep the environmental balance.
2. Predators help preys to get rid of weak or sick members and allow strong ones in the prey populations to reproduce.
3. If there are no predators, there will be an increase in the numbers of preys, no sufficient food, competition and death of preys or preys become weak and feeble with diseases.

2. Saprophytism relationship (bacteria and fungi are decomposers):

1. They decompose bodies of dead organisms.
2. They complete the food chains and webs.
3. They recycle the chemical elements within the ecosystem such as carbon, nitrogen, and sulphur, so new living organisms get these elements.
4. They help in some industries such as:
   a. **Food industry:** in making cheese, yoghurt, vinegar, bread and alcohol.
   b. **Drugs industry:** such as antibiotics.
   c. **Leather tanning industry.**

3. Give a reason

1. Living organisms use defensive weapons, proper adaptations and mimicry.
   - Because they compete with each other to get their food.
2. Predation is a temporary relationship.
   - Because it ends by devouring of the prey or a part of it.
3. Predation is less common in the plant world.
   - Because plants are autotrophic organisms that can make their food by photosynthesis.
4. Predation is more common in the animal world.
   - Because animals get food from bodies of other living organisms.
5. The relationship between a lion and a deer is predation.
   - Because the lion devours the deer.
6. Plants are autotrophic organisms.
   - Because they can make their own food by photosynthesis using simple substances in the presence of sunlight.
7. Some plants cannot make proteins although they can perform photosynthesis to produce carbohydrates.
   - Because they cannot absorb some compounds from soil to make proteins.
8. Drosera is an insectivorous plant.
   - Because it feeds on insects to get the required elements for making proteins.
9. Some animals have the ability for camouflage.
   - To hide from enemies as they simulate the color of the surrounding environment.
10. A cuttlefish can hide from enemies.
    - Because it ejects a black fluid in water when it is attacked by enemies to hide from them.
11. A chameleon can hide from enemies.
    - It changes its color to simulate the color of its surrounding environment.
12. Some bees look like wasps because of the lines on their bodies.
    - To frighten their enemies which are afraid of wasps.
13. A butterfly stands on a tree with a similar color.
    - To hide from enemies by camouflage.
14. Some frogs can change their colors.

General & Final Revision

- As camouflage; to hide from enemies.

15. A chameleon simulates the color of its surrounding environment.
    - As camouflage; to hide from enemies.
16. The cuttlefish ejects a black colored fluid in the surrounding water when it is attacked by enemies.
    - As camouflage; to hide from them.
17. The relationship between nodular bacteria and legumes is mutualism.
    - Nodular bacteria provide the leguminous plants with nitrogen in an inorganic form, while leguminous plants provide bacteria with sugar.
18. There is a commensalism relationship between the sponge and tiny aquatic living organisms.
    - Because tiny aquatic organisms get food and shelter from canals and fissures found in the sponge, while the sponge neither benefits nor is harmed from these living organisms.
19. The parasitism relationship differs from the predation relationship.
    - Because the parasite depends on the host completely to get food causing its weakness, but does not kill it like predators which kill their preys.
20. Saprophytic organisms are decomposers.
    - Because they get food by decomposing food remains or dead bodies.
21. Bread mold, mushroom and penicillium fungi are saprophytes.
    - Because they get their food by decomposing food remains or bodies of dead organisms.
22. Host death is a loss for the parasite.
    - Because the parasite will lose its main source of food and shelter.
23. Lice, bugs, mosquitoes and ticks are external parasites.
    - Because they live on a host's body and feed by sucking its blood.
24. Tape, ascaris, filarial, bilharzia and liver worms are internal parasites.
    - Because they live in a host's body and share its digested food or feed on its tissues and cells.
25. Parasitism causes the weakness of the host.
    - Because the parasite depends completely on the host to get its food causing weakness of the host.
26. The plants depend on the soil.
    - To absorb water to make food by photosynthesis.

27. Some animals depend on plants to get food directly and indirectly.
    - Because some animals are herbivores which feed on plants directly and others are carnivores which feed on animals which feed on plants.
28. The change in natural circumstances causes an environmental imbalance.
    - Because it causes the disappearance of some organisms and the appearance of other organisms.
29. A competition may appear among prey populations in the ecosystem.
    - Due to insufficient food resources for preys.
30. Predators are useful for prey populations.
    - Because they help preys to get rid of weak or sick members and let the strong ones reproduce adding strong members to the populations.
31. The predation relationship plays an important role in keeping a balance within the ecosystem.
    - Because predation organizes the numbers of prey populations.
32. Saprophytic organisms are guards of the nature.
    - Because they get rid of dead bodies and recycle chemical elements such as carbon, nitrogen and sulphur found in these bodies back to the environment to be used by other organisms.
33. Dinosaurs became extinct in ancient eras.
    - Due to the change in the natural conditions of their ecosystem.

4. What happens if ...?

1. There is no food in the environment.
    - Death of all living organisms.
2. A cuttlefish (sepia) is attacked by enemies.
    - It ejects a black fluid in water as camouflage.
3. A chameleon is attacked by enemies.
    - It simulates the color of its surrounding environment.
4. Leguminous plants have no nodular bacteria in their roots.
    - They cannot get nitrogen in an inorganic form.
5. A frog is attacked by enemies.
    - It changes its color.

General & Final Revision

6. A parasite lives externally on the host's body.
   - It sucks its blood and may convey a disease to the host.
7. A mosquito stands on your skin.
   - It will suck your blood and may convey malaria disease to you.
8. You splash some water drops on a slice of bread and leave it for two days.
   - A dark green layer is formed on the bread so the bread changes into rotten bread.
9. Introducing rabbits to an island with no natural enemies.
   - The number of rabbits increases, so the food resources become insufficient for them and this leads to competition and death.
10. Cutting down trees.
    - A disturbance in the environment occurs.
11. Killing American hawks.
    - Spreading of rats with loss of crops.
12. Natural changes take place within the ecosystem.
    - The disappearance of some organisms, the appearance of other organisms and the environmental imbalance.
13. An environmental imbalance takes place for a short or a long time.
    - A new environmental balance will occur.
14. There are no predators.
    - The number of preys increases with insufficient food resources leading to competition and death.
15. Absence of preys in the ecosystem.
    - The environmental imbalance will occur.
16. Preys do not find food and shelter in the ecosystem.
    - Competition and death will occur.
17. Saprophytes disappear from nature.
    - The earth will be covered by wastes, dead bodies and food remains.
18. Chemical elements are not recycled by saprophytic organisms.
    - Other living organisms cannot get benefits from these elements.

5. Comparisons

1.

P.O.C.	Predation	Parasitism
Definition	• A temporary food relationship which ends by devouring of the prey or a part of it.	• A food relationship between two different kinds of living organisms where one benefits from the other, while the other one is harmed.
Harms	• The prey is killed.	• The host becomes weak.
Ex.	**The relation between a lion and a deer.**	**The relation between a flarial worm and man.**

2.

P.O.C.	Commensalism	Parasitism
Definition	• A superficial food relationship between two living organisms where one of them benefits from the other, while the other neither gets benefit nor is harmed.	• A food relationship between two different kinds of living organisms where one benefits from the other, while the other one is harmed.
Ex.	**The relation between the sponge and tiny aquatic organisms.**	**The relation between a bilharzia worm and man.**

3.

P.O.C.	Parasitism	Saprophytism
Definition	• A food relationship between two different kinds of living organisms where one benefits from the other, while the other one is harmed.	• A food relationship in which saprophytes get their food by decomposing food remains or bodies of dead organisms.
Ex.	**Lice – tapeworms – bugs**	**Mushroom - bread mold and penicillium fungus**

4.

P.O.C.	External parasitism	Internal parasitism
The place where the parasite lives	• On a host's body.	• In a host's body.
Food	• Sucking a host's blood.	• Sharing a host's food or feeding on its tissues and cells.
Ex.	**Mosquitoes – lice – bugs**	**(Bilharzia–tape-ascaris worms**

6. Diagrams

Food relationships

- Predation
- Symbiosis
  - Mutualism
  - Commensalism
  - Parasitism
- Saprophytism

The ecosystem

- Small (an area of land or a water pond)
- Large (a forest, a desert or an ocean)
- Very large (the universe)

Factors that disturb the environmental balance

- Natural changes
- Man interference
  - Cutting down trees
  - Burning forests
  - Polluting the environment
  - Eroding the soil

Factors that keep the environmental balance

- Predation
- Saprophytism

7. Important labels

1. Some food relationships:

The relation between	The type
A lion and a deer	• Predation
Drosera and an insect	• Predation
A wolf and a rabbit	• Predation
A cat and a rat	• Predation
Nodular bacteria and leguminous plants	• Symbiosis: mutualism
The sponge and tiny aquatic organisms	• Symbiosis: commensalism
Penicillium fungus and orange fruit	• Saprophytism
Bread mold and bread	• Saprophytism
Mosquitoes and man	• Symbiosis: external parasitism
Lice and man	• Symbiosis: external parasitism
Fleas and man	• Symbiosis: external parasitism
Jawless lamprey and fish	• Symbiosis: external parasitism
Bugs and a host	• Symbiosis: external parasitism
Lice and a host	• Symbiosis: external parasitism
Liver worm and its host	• Symbiosis: internal parasitism
Filarial worm and its host	• Symbiosis: internal parasitism
Ascaris worm and its host	• Symbiosis: internal parasitism
Bilharzia worm and its host	• Symbiosis: internal parasitism

2.

The phenomenon	The organism
Camouflage	• A butterfly stands on a tree with a similar color.
Camouflage	• A frog changes its color to suit its environment.
Camouflage	• A chameleon simulates its color to suit its environment.
Camouflage	• A cuttlefish ejects a black fluid in water.
Mimicry	• Some bees look like wasps.

General & Final Revision

3.

The parasite	Its type	The disease
Filarial worms	• Internal	• Elephantiasis
Mosquitoes	• External	• Malaria
Ascaris worms	• Internal	• Anemia
Fleas	• External	• Smallpox
Bilharzia worms	• Internal	• Bilharziasis

8. Main points

1. The sun is the main energy source for living organisms.
2. Predation is between a predator and a prey.
3. Drosera, dionaea and halophila are insectivorous plants.
4. Camouflage and mimicry are forms of self-defence against predation.
5. Symbiosis includes mutualism, commensalism and saprophytism.
6. Mushroom, bread mold and penicillium fungi are saprophytes (decomposers).
7. The ecosystem is a natural area that contains living organisms and non-living things.
8. The environmental balance is the balance among the components of the ecosystem.
9. Factors that disturb the environmental balance:
   a. Natural changes.
   b. Man's interference such as cutting down trees, burning forests, polluting the environment and eroding the soil.
10. Predation and saprophytism keep the environmental balance.

Unit 1 Energy

Lesson 1 Light

(Guide Answers P. 16)

Worksheet (1)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. Moonlight is the reflection of .... that falls on its surface.
2. The formation of shadow is an evidence that light travels in .... lines.
3. The material through which light can pass is called ....
4. Light can easily pass through .... and .... materials.
5. Carton paper is an example of .... materials.
6. The image formed through narrow holes is .... and ....

B. What is meant by...?

1. The visible spectrum.

....

2. Shadow.

....

3. Translucent materials.

....

2 **A. Choose the correct answer:**

1. The characteristics of the object's image that is formed through narrow holes are ....
   - a. minimized and inverted
   - b. enlarged and inverted
   - c. minimized and upright
   - d. enlarged and upright
2. The nearer the object to a light source, the .... the shadow.
   - a. smaller
   - b. bigger
   - c. more fainted
   - d. all the previous answers
3. The materials which things can be clearly seen behind are called ....
   - a. translucent materials
   - b. opaque materials
   - c. transparent materials
   - d. all the previous answers

4. The bouncing of light rays when they fall on a plane mirror is known as ....
   a. irregular reflection
   b. irregular refraction
   c. regular reflection
   d. regular refraction

B. What happens when...?

1. Sunlight passes through water droplets during rain falling.

   ....

2. You look at a mirror.

   ....

3 **A. Write the scientific term for each of the following:**

1. The light energy that can be seen. (..)
2. The materials which light cannot pass through. (..)
3. The materials which allow some light to pass through and we can see objects behind them less clearly. (..)
4. The reflection of light when it falls on a smooth and shiny surface. (..)
5. The main source of light on the earth's surface. (..)

B. Give a reason for each of the following:

1. The image formed through narrow holes is inverted.

   ....

2. The moon seems luminous.

   ....

3. Glass window is a transparent material.

   ....

4 **Look at the opposite figures, then answer:**

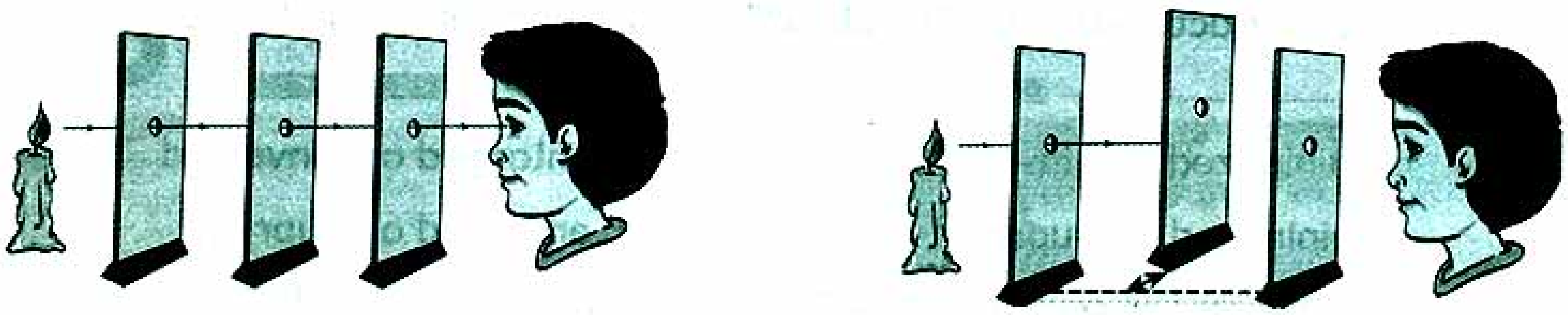


Fig. (1) Fig. (2)

1. Can you see the light of the candle in Fig. (1)? ....
2. Can you see the light of the candle in Fig. (2)? ....
3. General conclusion: ....

Worksheet (2)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. The nearer the object to the source of light, the .... shadow.
2. .... materials allow some light to pass through, but .... materials do not allow light to pass through.
3. The presence of .... and .... is necessary for light reflection.
4. The types of reflection are .... and ....
5. We see .... in the sky during rain.

B. Give a reason for each of the following:

1. We cannot see in the dark.

....

2. The formation of shadow.

....

3. White light can be separated.

....

2 **A. Write the scientific term for each of the following:**

1. The darkened area that is formed when light falls on opaque objects. (....................)
2. The material which allows light to pass through and objects can be seen clearly behind. (....................)
3. The going back of light when it falls on a shiny surface. (....................)
4. The reflection of light when it falls on a rough surface. (....................)
5. Seven spectrum colors which appear in the sky after rainfall. (....................)

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. Light	a. is an opaque material.
2. Shadow	b. separates light into seven colors.
3. Glass	c. is a transparent material.
4. Cardboard	d. propagates in straight lines.
5. Prism	e. reflects sunlight.
	f. is a dark area formed behind a body exposed to light.

1. .... 2. .... 3. .... 4. .... 5. ....

3 **A. Put (✓) or (✗) and correct the wrong ones:**

1. Light propagates in straight lines. ( )
2. The image formed through narrow holes is always upright. ( )
3. The formation of shadow shows that light travels in curved lines. ( )
4. Carton is an opaque material and light can pass through. ( )
5. A spoon appears broken when it is placed in a glass of water due to reflection of light. ( )

B. What is meant by...?

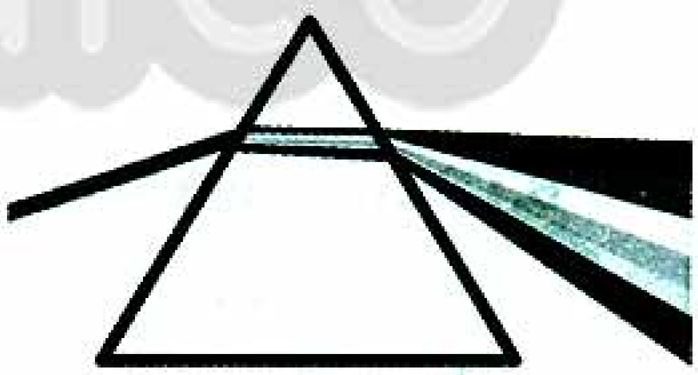
1. A semi-transparent material.
....
2. Regular reflection.
....
3. Light reflection.
....
4. Opaque material.
....

C. Give a reason for each of the following:

1. The pencil is seen broken in water.
....
2. Appearance of rainbow in the sky during rainfall.
....

4 **A. Look at the opposite figure, then answer:**

1. This figure shows the .... of white light into .... by a glass prism.
2. What happens when these seven colors accumulate with each other?
3. What is your conclusion?



B. What happens when?

1. Light rays fall on a rough surface.
....
2. Light rays transfer from a transparent medium to another one.
....
3. Put your hand between a wall and a source of light.
....

Lesson 2 Seeing colored objects

(Guide Answers P. 16)

Worksheet (3)

(Total marks: 20)

1 A. Complete the following sentences:

1. Colored transparent and translucent objects have the same colors of the color which .... through it.
2. When white light strikes a red apple, it absorbs all the spectrum colors and reflects .... light only.
3. Yellow color is formed by mixing .... and .... colors.
4. As the light falls on green grass, the grass absorbs .... colors except the .... color.

B. Put (✓) or (✗) in front of the following statements and correct the wrong ones:

1. When white light strikes a red rose, it reflects the white color. (   )
   ....
2. An object seems white since it reflects all the colors which the white light is made up of. (   )
   ....
3. If you look at a yellow banana through a green glass sheet, it seems black. (   )
   ....
4. Transparent objects have the same color of the light that passes through. (   )
   ....

2 A. Choose the correct answer:

1. Mixing all the spectrum colors together produces the .... light.
   a. white b. yellow c. black d. red
2. The strawberry fruit seems red because it .... the red color only.
   a. refracts b. absorbs c. transmits d. reflects
3. The apple seems to be .... when you look at it through a transparent green glass sheet.
   a. red b. black c. yellow d. green

B. What happens when...?

1. Sunlight falls on a black object.

....

2. Red light strikes a black surface.

....

3. White light falls on a green window.

....

3 **A. Write the scientific term for each of the following:**

1. The light which is produced by mixing the seven spectrum colors. (..............................)
2. Objects that can be seen with the color of their reflected light. (..............................)
3. The seven colors of light which sunlight is made up of. (..............................)
4. The objects that absorb all light colors when white light falls on them. (..............................)

B. Give a reason for each of the following:

1. A green glass window appears green when a white light falls on it.

....

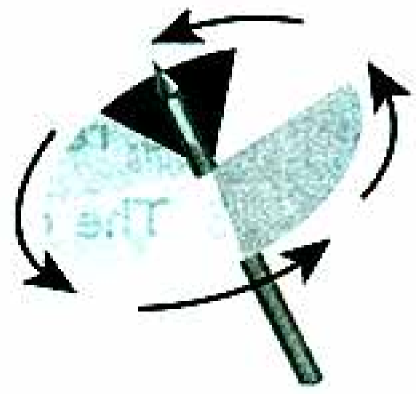
2. A banana fruit appears yellow when sunlight falls on it.

....

4 **A. Compare between...:**

White opaque objects	Black opaque objects
....	....
....	....

B. Look at the opposite figure, then answer:



1. What happens when you rotate this disk quickly?

....

2. What is your conclusion?

....

Worksheet (4)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. Red light + green light + blue light = ...
2. If the seven spectrum colors are mixed together, they produce ....
3. .... reflects its own light only, while .... allows its own color only to pass through.
4. Red, green and blue are called .... colors.

B. What happens when...?

1. Sunlight passes through a glass prism.

....

2. Mixing red and green lights.

....

3. A green light strikes a white ball.

....

2 **A. Choose the correct answer:**

1. .... reflect all light colors.
   a. White opaque objects b. Black opaque objects c. Yellow opaque objects
2. The black board .... all light colors.
   a. absorbs b. reflects c. refracts
3. All the following lights are secondary light colors except ....
   a. magenta b. cyan c. green
4. .... are among the secondary light colors.
   a. Red and green b. Red and cyan c. Cyan and yellow
5. Mixing .... lights produces the magenta light.
   a. red and green b. red and blue c. red and yellow

B. Look at the opposite figures, then complete:

1. The two opposite figures represent two types of light ....
2. Figure (a) represents ....
3. Figure (b) represents ....

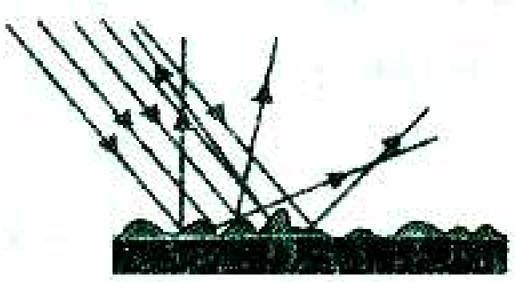


Fig. (a)

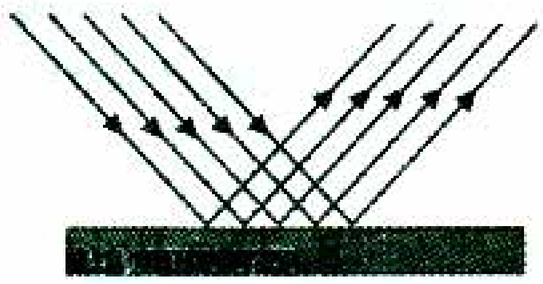


Fig. (b)

C. Choose from column (B) what suits in column (A):

(A)	(B)
1. Yellow	a. is produced by mixing the red and blue lights.
2. Red	b. is produced by mixing the red and green lights.
3. Cyan	c. is produced by mixing the green and blue lights.
4. Magenta	d. is produced by mixing the primary light colors.
5. White	e. is known as a primary light color.
	f. is produced by mixing the secondary light colors.

1. .... 2. .... 3. .... 4. .... 5. ....

3 A. Put (✓) in front of the right statement and (✗) in front of the wrong one and correct the wrong ones:

1. The glass prism separates the white light into 10 colors. (   )
2. Mixing the seven light colors gives red light. (   )
3. Transparent objects have the same color of light that passes through. (   )
4. An object seems white because it reflects all light colors. (   )
5. Mixing yellow, green and blue gives white light. (   )

B. What is meant by...?

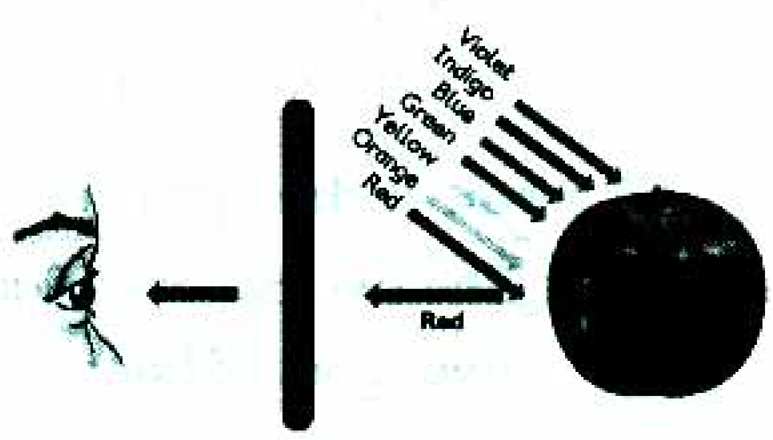
1. Primary light colors. ....
2. Secondary light colors. ....

4 A. Give a reason for each of the following:

1. We see a white paper as it is.
....
2. The blackboard appears black.
....

B. Look at the opposite figure, then answer:

1. The apple appears to be .... behind the glass sheet.
2. What happens when we replace the red sheet with a green one? ....
....
3. The light colors that fall on the apple are called ....



Lesson 3 Magnetism

(Guide Answers P. 17)

Worksheet (5)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. Ancient Greeks discovered black rocks in a region called ...., and these rocks attract materials which are made of ....
2. Materials can be divided into .... and .... due to their magnetic abilities.
3. The magnet's pole that always refers to the north direction of the Earth is called ....
4. The magnet has the most powerful force of attraction at its ....
5. Like poles .... each other, whereas unlike poles .... each other.

B. What is meant by...?

1. The natural magnet.

....

2. Magnetic materials.

....

3. Magnetic field.

....

2 **A. Choose the correct answer:**

1. The black iron ore is known as ....
   a. the magnetic field b. the natural magnet
   c. the magnetic force d. magnetic materials
2. The materials that are attracted to the magnet are called ....
   a. the magnetic field b. the magnetic force
   c. the magnetic compass d. the magnetic materials
3. When a magnet is hung freely, its south pole is directed towards the ....
   a. north b. south c. east d. west
4. When you place a magnet near some paper clips, ...
   a. the clips are attracted to the two poles of the magnet
   b. the clips are attracted to the south pole of the magnet
   c. the clips are attracted to the north pole of the magnet
   d. the clips are not attracted to the poles of the magnet

5. All the following are magnetic materials except ....
   a. iron b. steel c. wood d. cobalt

B. Mention the properties of the magnet.

....

3 A. What happens if...?

1. You fix a magnetic needle on a piece of cork, then put it in a basin containing water.

....

2. A magnet is hung to move freely.

....

3. You place a magnet near some iron paper clips and copper wires.

....

B. Correct the underlined words:

1. Magnetite is an artificial magnet.
2. A natural magnet is one of the iron ores known as cobalt.
3. The materials that are attracted to a magnet are electric materials.
4. Aluminum gets attracted to the magnet.

4 A. Which of the following is a magnetic substance and which is a non-magnetic substance?

(plastic – copper – iron nails – glass – pins – wood – aluminum – gold – paper clips – iron car)

Magnetic substances	Non-magnetic substances
....	....
....	....

B. Give a reason for each of the following:

1. Some materials are called magnetic materials.

....

2. When you place some iron nails near a magnet, most nails are attracted to the two poles.

....

Worksheet (6)

(Total marks: 20)

1 **A. Put (✓) in front of the right statement and (✗) in front of the wrong one:**

1. Like magnetic poles repel each other, but unlike magnetic poles attract each other. ( )

....

2. The magnetic field is the space surrounding the magnet where the magnetic force appears. ( )

....

3. The magnetic force is a visible force. ( )

....

4. The magnetized needle is the basic idea of making the compass. ( )

....

B. What happens when ...?

1. You approach the north pole of a magnet close to the south pole of another magnet.

....

2. You put the north pole of a magnet close to the north pole of another magnet.

....

2 **A. Write the scientific term for each of the following:**

1. The space around a magnet where the magnetic force appears. (..............................)
2. The pole of the magnet that is attracted to the north pole of another magnet. (..............................)
3. The object that consists of a small light magnetic needle that can spin freely around a fixed axis. (..............................)
4. The force by which a magnet attracts some materials. (..............................)
5. The set that is used for locating the four main geographical directions. (..............................)

B. Give a reason for each of the following:

1. Steel and cobalt are attracted to the magnet.

....

2. The magnet attracts metallic paper clips, but does not attract copper wires.

....

3 A. What is meant by ...?

1. The poles of magnet.

....

2. Non-magnetic materials.

....

3. The magnetic force.

....

B. You have two pieces of metals, one is made of aluminum and the other is made of iron. How can you identify them?

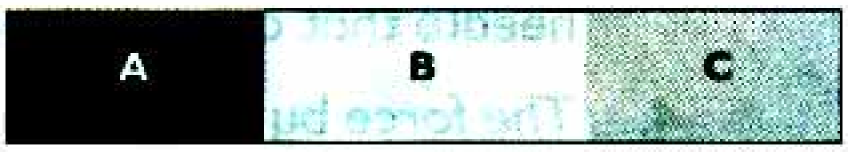
....

4 A. Choose from column (B) what suits in column (A):

(A)	(B)
1. The artificial magnet	a. is used to identify the four main geographical directions.
2. The magnetic field	b. is one of the iron ores which is known as magnetite
3. The magnetic poles	c. is a man-made magnet.
4. The natural magnet	d. the areas of the magnet which have the most powerful force of attraction.
5. The compass	e. is a space near a magnet where the effect of the magnetic force appears.

1. .... 2. .... 3. .... 4. .... 5. ....

B. Look at the opposite figure, then answer the following questions:



1. Region (A) represents ....
2. Region (B) represents ....
3. Region (C) represents ....
4. Which region has no effect on magnetic materials?

....

....

Lesson 4 Magnetism and electricity

Worksheet (7)

(Guide Answers P. 18)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. The magnet which is made by the effect of electricity is called ....
2. The magnetic power of the electromagnet .... by increasing the number of turns in the coil.
3. The electromagnet changes .... energy into .... energy.
4. The electromagnet is used in many devices such as .... and ....
5. .... is used to pick up huge metal blocks.

B. How can you increase the magnetic force of a magnet?

....

2 **A. Choose the correct answer:**

1. When an electric current passes through a coil of wire twisted around a wrought iron bar, the wrought iron bar becomes a .... magnet.
   a. temporary b. permanent c. strong d. weak
2. The magnet which is made by the electricity is a/an ....
   a. natural magnet b. electromagnet c. magnetite d. no correct answer
3. The electromagnet loses its magnetism ....
   a. by increasing the intensity of electric current
   b. by increasing the number of coil turns
   c. by increasing the number of batteries
   d. by cutting the electric current
4. The magnetic force of the electromagnet increases ....
   a. by decreasing the intensity of the electric current
   b. by increasing the number of coil turns
   c. by decreasing the number of batteries
   d. by cutting the electric current

B. Correct the underlined words:

1. The electromagnet consists of an iron bar and a coil <u>only</u>.
2. We must <u>decrease</u> the number of coil turns in the electromagnet to increase the magnetic force.
3. A <u>huge dynamo</u> is used in a bicycle to light its bulb.

3 **A. Write the scientific term for each of the following:**

1. The device that is used to change electric energy to magnetic energy. (..............................)
2. The device that is used to change kinetic energy to electric energy. (..............................)
3. The device that is used in electric power stations to generate electricity. (..............................)
4. The device that is used to carry heavy metal blocks. (..............................)

B. What happens when...?

1. You increase the number of turns in the coil of the electromagnet.

....

2. You increase the number of batteries in the electromagnet.

....

4 **A. Give a reason for each of the following:**

1. It is preferable to increase the number of batteries in the electromagnet.

....

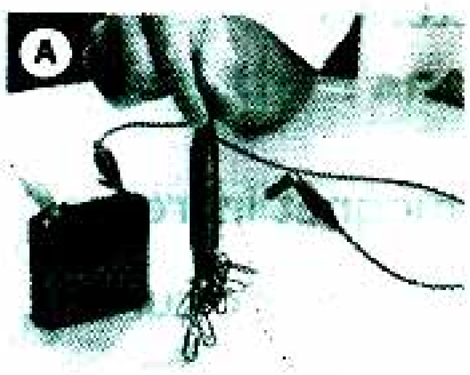
2. When an electric current flows through a wire winding around a wrought iron nail, the nail attracts iron filings.

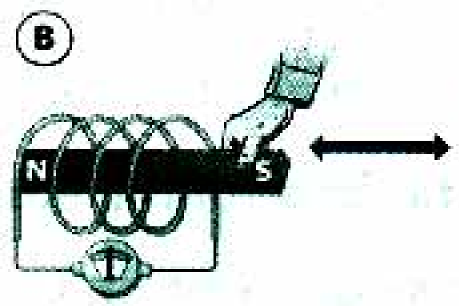
....

3. An electromagnet is called a temporary magnet.

....

B. Study the following figures, then answer:





1. What is the name of each device? ....
2. What is the idea of their working? ....
3. Mention one use for each one. ....

Worksheet (8)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. The dynamo changes .... energy to .... energy.
2. The electric current produced by a dynamo increases by .... and ....
3. In the bicycle, ... is used to light the bulb.
4. The electric current has a .... effect.
5. .... changes electric energy to magnetic energy.

B. Mention one use for each of the following:

1. The electromagnet. ....
2. The huge dynamo. ....
3. Cranes (winches). ....

2 **A. Choose the correct answer:**

1. The apparatus that converts the kinetic energy into electric energy is called a/an ....
   a. battery b. dynamo c. electric generator d. (b) and (c)
2. The electric generator (dynamo) works on changing the ....
   a. kinetic energy into electric energy
   b. electric energy into mechanical energy
   c. magnetic energy into mechanical energy
   d. electric energy into magnetic energy
3. The electric current produced by the electric generator (dynamo) increases ....
   a. by using a strong magnet b. by increasing the number of coil turns
   c. by using a weak magnet d. (a) and (b)
4. The coil of a dynamo is made up of a .... wire.
   a. carbon b. copper c. plastic d. graphite
5. The dynamo that is fixed in the bicycle touches the bicycle's ....
   a. seat b. pedal c. tire d. gear
6. All the following are among the uses of the electromagnet except ....
   a. in factories to move heavy iron blocks b. making electric bells
   c. making TV sets d. making electric lamps
7. The huge dynamo is used in ....
   a. lighting cities b. operating factories
   c. lighting the bicycle's bulb d. (a) and (b)

B. Explain briefly the idea of making a dynamo.

....

3 **A. Put (✓) in front of the right statement and (✗) in front of the wrong one and correct it:**

1. The amount of electricity produced from the dynamo can be increased by using a weak magnet. (   )
2. We can make magnets by using electricity. (   )
3. Magnetism is always related to electricity. (   )
4. The magnetic force of an electromagnet decreases by increasing the number of turns in the coil. (   )
5. The electromagnet loses its magnetism when the electric current is disconnected. (   )
6. The huge electromagnet is used in cranes. (   )

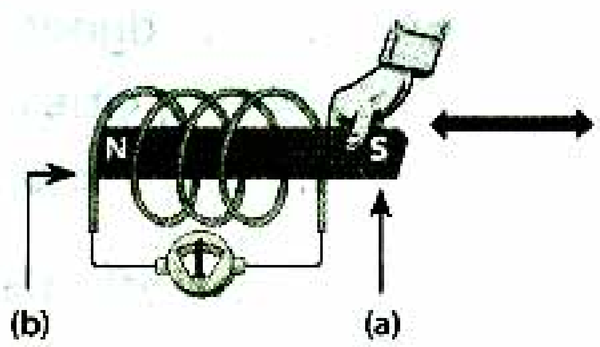
B. Give a reason for each of the following:

1. A dynamo changes the mechanical energy into electric energy.
2. The deviation or movement of the ammeter's pointer when moving the copper wire between the two poles of a magnet.
3. The electromagnet is used to lift heavy iron blocks.
4. In the dynamo, we must increase the motion of the coil between the two poles of the magnet.

4 **A. Compare between the electromagnet and the dynamo according to their scientific idea and structure.**

B. Look at the opposite figure, then complete the following:

1. Part (a) is ...., but part (b) is ....
2. When part (a) is moved inside part (b), ... is generated in part (b).
3. This means that .... energy can be changed into .... energy.
4. This is the idea of making ....



TIMSS Like questions on Unit 1

Guide Answers P. 18

1 **In this exercise, you will apply what you know about magnets. Write the correct words in the spaces. Choose your words from this list:**

(closed - magnetism - steel - magnetic - bar - keepers - ring)

a. A magnet can attract certain materials to it. An example is .... Materials that are attracted by a magnet are called .... materials.

b. A fridge door has strip magnets down the side of the door. These magnets help to keep the door .... firmly.

c. Three types of magnets are horseshoe, ... and .... magnets.

d. All magnets lose their .... if you drop them or bang them together.

e. You must store magnets with .... on their ends to keep them strong.

2 **Fill in the spaces in these sentences.**

a. A magnet has a north pole and a .... pole.

b. Like poles .... each other.

c. Unlike poles .... each other.

3 **Here are some terms that you have learnt while studying magnetism.**

Magnetic field	Electromagnet	Magnetic pole	Magnetic field line
Ammeter	Core	Compass	Like poles

The table below shows definitions of four of these terms. Write the terms in the spaces in the first column.

Term	Definition
a.	A temporary magnet which changes electric energy to magnetic energy.
b.	Two north magnetic poles, or two south magnetic poles.
c.	An instrument used to measure electric current.
d.	A line drawn to show the direction of a magnetic field.

4 **Each statement below has an incorrect part:**

- Cross out the incorrect part of each statement.
- In the space below, write a correction so that the statement is correct.

1. A bar magnet has a north pole at one end and a west pole at the other.

....

2. The north pole of a magnet is attracted to the earth's south pole.

....

3. A bar magnet needs an electricity supply to work.

....

4. The core of an electromagnet must be made of a non-magnetic material.

....

5. An electromagnet remains magnetized when the electric current in its coils is switched off.

....

6. Decreasing the current in an electromagnet will make its magnetic field stronger.

....

5 **The picture below shows a bird landing at a bird feeder outside a window.**



- The image of this bird in the window is the result of light being

1. absorbed. (....................)
2. reflected. (....................)
3. transmitted. (....................)
4. refracted. (....................)

Al-Adwaa General Tests on Unit 1

Guide Answers P. 18

Test 1

1 **A. Write the scientific term for each of the following:**

1. The phenomenon that occurs when sunlight passes through water droplets during rainfall. (..........)
2. The colored light that is produced by mixing red and blue lights. (..........)
3. The device that converts electric energy into magnetic energy. (..........)
4. The light that results from mixing the seven spectrum colors. (..........)
5. The seven colors of light which sunlight is made up of. (..........)

B. Give a reason for each of the following:

1. Nickel, iron and cobalt are magnetic materials.

....

2. We see the white board as it is.

....

3. We cannot see any object behind a sheet of carton paper.

....

4. A dynamo changes the mechanical energy into electric energy.

....

2 **A. Complete the following sentences:**

1. The white light can split into .... colors that are called ....
2. Red light + green light + blue light = ...
3. The magnet has .... poles which are .... and ....
4. When the white light strikes a black opaque object, this object .... all the spectrum colors and does not .... any color.
5. Light reflects when it falls on .... and .... surfaces.

B. What happens if...?

1. You look at a picture through tissue paper.

....

2. You mix green and blue lights.

....

3. A magnet is hung to move freely.

....

4. Sunlight strikes a transparent blue bottle.

....

3 **A. Choose the correct answer:**

1. The bar used in an electromagnet is made up of ....
   a. alumimum b. wrought iron c. steel d. copper
2. The characteristics of the object's image that is formed through narrow holes are ....
   a. minimized and inverted b. enlarged and inverted
   c. minimized and upright d. enlarged and upright
3. As light falls on the banana fruit, the banana absorbs all colors except the .... one.
   a. red b. yellow c. black d. green
4. The magnetic force of the magnet disappears at ....
   a. its two poles b. the south pole of the magnet
   c. the north pole of the magnet d. its middle
5. Once the seven spectrum colors accumulate with each other, you can see the .... light.
   a. red b. blue c. orange d. white

B. Mention one use for each of the following:

1. The electromagnet. ....
2. The huge dynamo. ....
3. Cranes. ....

4 **A. Mention the properties of the magnet.**

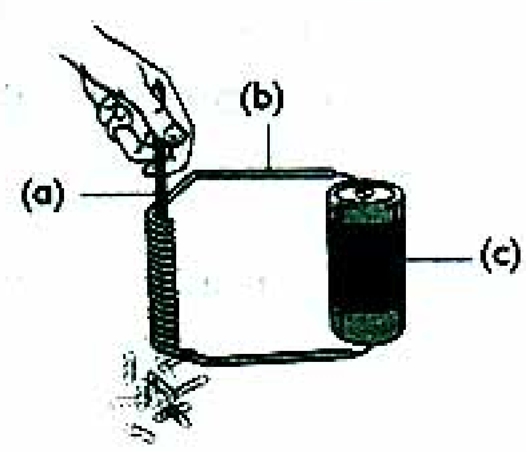
....

B. What is meant by...?

1. The magnet. ....
2. The magnetic field. ....
3. The electromagnet ....

C. Label the diagram:

a. ....
b. ....
c. ....



Test 2

1 A. Complete the following sentences:

1. A dynamo changes the .... into electric energy.
2. Ancient Greeks discovered black rocks in a region called .... and these rocks attract materials which are made of ....
3. Moonlight is the reflection of the .... that falls on its surface.
4. Mixing .... and .... lights gives the magenta light color.

B. Choose the correct answer:

1. .... does not allow light to pass through.
   a. Tissue paper b. Fruit c. Clear glass d. Air
2. All the following are primary colors except ....
   a. red b. green c. blue d. yellow
3. The strawberry fruit seems red as it .... the red color only.
   a. refracts b. absorbs c. transmits d. reflects
4. When the magnet is hung freely, it points to the .... direction.
   a. north-west b. north-east c. north-south d. east-south

2 A. Put (✓) in front of the right statement and (✗) in front of the wrong one:

1. Light bouncing after falling on an object is called light refraction. (   )
2. We can see the spectrum colors when sunlight passes through water droplets during rainfall. (   )
3. Yellow, purple and blue are secondary light colors. (   )
4. The space around a magnet where the magnetic force appears is called the magnetic field. (   )

B. What happens in each of the following?

1. Moving a copper wire between two poles of a magnet.

....

2. You look at the mirror.

....

3. You suspended a bar magnet to move freely.

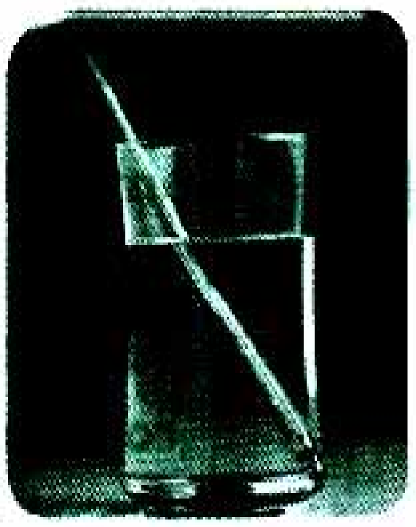
....

4. Seeing the spoon inside a glass containing water.

....

Worksheets & Exams

3 **A. Look at the opposite figure, then answer:**



1. The opposite figure indicates the .... phenomenon.
2. The speed of light through air is .... its speed through water.
3. Why does the pencil appear broken? ....

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. Light	a. is an opaque material.
2. Shadow	b. separates light into seven colors.
3. Glass	c. is a transparent material.
4. Carton paper	d. propagates in straight lines.
5. Prism	e. reflects sunlight.
	f. is a dark area formed behind a body exposed to light.

1. .... 2. .... 3. .... 4. .... 5. ....

4 **A. Compare between regular reflection and irregular reflection.**

Regular reflection	Irregular reflection
....	....
....	....
....	....

B. Give a reason for each of the following:

1. Clear water and transparent plastic are transparent materials.
....
2. The formation of the light spectrum.
....
3. In the electromagnet, we have to increase the number of batteries.
....
4. Some materials are known as non-magentic materials.
....

Test 3

1 A. Complete the following sentences:

1. The glass prism separates the white light into .... spectrum colors.
2. In the dynamo, ... energy changes to .... energy.
3. The magnetic force of the magnet is concentrated at ....
4. The spectrum colors start with .... and end with ....
5. If you stand at 25 cm from a plane mirror, your image is formed at .... cm from you.

B. Write the scientific term for each of the following:

1. The colors: yellow, cyan and magenta. (....................)
2. The reflection of light when it falls on a rough surface (containing protrusions). (....................)
3. The tool which is used to separate white light into seven spectrum colors. (....................)
4. The set which is used for locating the four main geographical directions. (....................)
5. The object which absorbs all the spectrum colors falling on it. (....................)

2 A. Give a reason for each of the following:

1. A magnet attracts metallic paper clips but does not attract copper wires.

....

2. Yellow is known as a secondary light color.

....

3. The moon seems luminous.

....

4. You can see your face in a plane mirror.

....

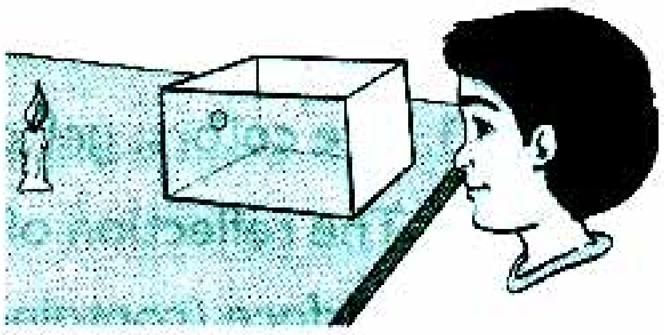
5. A compass is used for locating the four main geographical directions.

....

B. Put (✓) in front of the right statement and (✗) in front of the wrong one:

1. Mixing the red color with the green color gives the yellow color. (   )
2. When an object approaches a light source, the area of the shadow decreases. (   )
3. An object seems white since it reflects all the colors which white light is made up of. (   )
4. In the irregular reflection, light rays are reflected in one direction. (   )
5. The magnetized needle is the basic idea of making the compass. (   )

3 **A. Look at the opposite figure, then answer:**



1. What is your observation?

....

2. What is your inference?

....

B. Mention one use for the following:

1. The compass.

....

2. The electromagnet.

....

4 **A. What happens if...?**

1. You approach paper clips to a magnet.

....

2. You approach the north pole of a magnet to the north pole of another magnet.

....

B. Mention one use for:

1. A glass prism.

....

2. The electromagnet.

....

3. The dynamo.

....

Unit 2 Mixtures

Lesson 1 Mixtures

(Guide Answers P. 21)

Worksheet (9)

(Total marks: 20)

1 A. Complete the following sentences:

1. The substance that is made of only one type of identical particles is known as ...., while the substance which consists of more than one is known as ....
2. The mixture of soda water is produced from dissolving .... gas in a .... solution.
3. The mixture of sand and iron filings can be separated by ....
4. Sugar and water can be mixed by .... or ....

B. Define each of the following:

1. A pure substance. ....
2. A mixture. ....
3. A solid-solid mixture. ....
4. A liquid-liquid mixture. ....

2 A. Choose the correct answer:

1. All the following are examples of mixtures except ....
   a. baking soda b. concrete c. milk d. tomato sauce
2. Among the examples of gaseous-liquid mixtures is the ....
   a. mixture of vinegar and water b. mixture of sand and water
   c. mixture of soda water d. atmospheric air
3. A mixture can be formed by ....
   a. shaking b. stirring
   c. grinding d. all the previous answers
4. All the following are examples of pure substances except ....
   a. milk b. distilled water c. table salt d. baking soda

B. Choose from column (B) what suits column (A):

(A)	(B)
1. Distilled water	a. is a solid-liquid mixture.
2. Seawater	b. is a pure substance.
3. Oil and water	c. is a homogeneous liquid mixture.
4. Vegetable salad	d. is a heterogeneous liquid mixture.
	e. is a solid-solid mixture.

1. .... 2. .... 3. .... 4. ....

3 A. Write the scientific term for each of the following:

1. Substances that consist of more than one type of particles. (..................)
2. A type of matter whose components keep their own properties. (..................)
3. A mixture of oxygen gas, hydrogen gas, carbon dioxide gas and water vapor. (..................)
4. A mixture of water and some useful minerals. (..................)
5. A mixture of carbon dioxide gas in a sugary solution. (..................)

B. Give a reason for each of the following:

1. Air is considered a mixture.

....

2. Sugar is considered a pure substance.

....

3. No mixing will happen on adding sand to water.

....

4 A. What happens in case of...?

1. Mixing salt and water.

....

2. Mixing different juices together.

....

B. Cross the odd word out:

1. Sugar – salt – baking soda – concrete (..................)
2. Tomato sauce – apple juice – strawberry juice – banana juice (..................)

Worksheet (10)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. The components of the mixture can be .... by any ....
2. Sand and salt can be mixed by .... or ....
3. The magnetic attraction is used to separate a .... mixture that contains .... substance.
4. The evaporation process is used to separate .... materials that are .... in water.
5. The separating funnel is used to separate the heterogeneous .... mixtures.

B. Correct the underlined words:

1. The atmospheric air is an example of liquid-liquid mixtures. (....................)
2. A sugary solution can be formed by shaking or grinding. (....................)
3. A mixture of vinegar and water is an example of solid-liquid mixtures. (....................)
4. A salty solution can be formed by grinding. (....................)
5. The separating funnel is used to separate a mixture of sugar and water. (....................)

2 **A. Put (✓) in front of the right statement and (X) in front of the wrong one and correct it:**

1. The separating funnel is used to separate heterogeneous liquid mixtures. (   )
2. Filtration is used to separate oil-water mixtures. (   )
3. Salt and water are mixed together by stirring or heating. (   )
4. Filtration is used to separate a mixture that has a soluble solid material. (   )
5. We can use the evaporation process to separate crushed coffee from water. (   )

B. Give a reason for each of the following:

1. A fruit salad mixture is considered an example of solid-solid mixtures.

....

2. A mixture of vinegar and water is considered an example of liquid-liquid mixtures.

....

3. A sand and water mixture is considered an example of solid-liquid mixtures.

....

Worksheets & Exams

3 **A. Write the scientific term for each of the following:**

1. The mixture that is produced by dissolving carbon dioxide gas in a sugary solution. (..................)
2. A mixture resulting from the solubility of solids in liquids. (..................)
3. The process that is used in the formation of a solution. (..................)
4. Leaving an amount of seawater exposed to the sun rays for many days. (..................)
5. Heating a salty solution gently. (..................)

B. Choose from column (B) what suits in column (A):

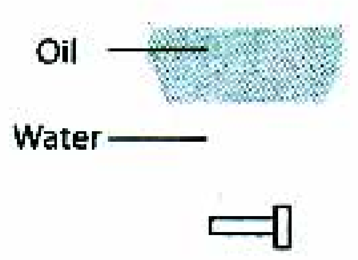
(A)	(B)
1. The separating funnel	a. is a solid-solid mixture.
2. The atmospheric air	b. is a gaseous-liquid mixture.
3. Fruit salad	c. is used to separate sand and water mixtures.
4. The mixture of carbon dioxide gas in a sugary solution	d. is used to separate oil-water mixtures.
5. Filtration process	e. is a gaseous-gaseous mixture.

1. .... 2. .... 3. .... 4. .... 5. ....

4 **A. Mention one use for each of the following:**

1. A filter paper. ....
2. A separating funnel. ....
3. A magnet. ....

B. Look at the following figure and then answer the questions:



1. Which apparatus is shown in this figure?

....

2. Why do we use this tool in separating some types of mixtures?

....

3. What is the mixture that can be separated by this tool?

....

Lesson 2 Solutions

(Guide Answers P. 22)

Worksheet (11)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. A solution is a type of ....
2. A solution consists of a .... and a ....
3. A solution consists of a solute which is .... and a solvent which is ....
4. The stirring process is necessary for .... the solute in the ....
5. .... is a heterogeneous liquid mixture in which the particles of the solute are .... throughout the solvent.
6. Among the examples of suspension are .... and ....
7. Shaking has the same effect of the .... process.

B. What is meant by ...?

1. A homogeneous mixture. ....
2. A solvent. ....
3. A solubility process. ....

2 **A. Put (✓) in front of the right statement and (X) in front of the wrong one and correct it:**

1. A mixture of sugar and water is a heterogeneous mixture. (   )
....
2. A solvent is a liquid used to dissolve the solid material in it. (   )
....
3. Solute + solvent $\xrightarrow{\text{solubility process}}$ solution (   )
....
4. Solubility time increases as the amount of the solvent decreases. (   )
....
5. Solubility speed decreases by shaking and rising the temperature. (   )
....
6. Solubility speed of solids increases by grinding. (   )
....

B. What happens when...?

1. Putting a spoonful of salt in an amount of water and then stirring them by using a glass rod.

 ....

2. Stirring two equal amounts of sugar in two beakers containing unequal amounts of water.

 ....

3 A. Give a reason for each of the following:

1. A salty solution is a homogeneous mixture.

 ....

2. The natural orange juice is a heterogeneous mixture.

 ....

3. The apple juice is a solution.

 ....

B. Correct the underlined words:

1. Increasing the quantity of a solvent <u>increases</u> dissolving time.

 ....

2. <u>Filtration</u> is used to separate substances dissolved in the solution.

 ....

3. Stirring <u>decreases</u> solubility process.

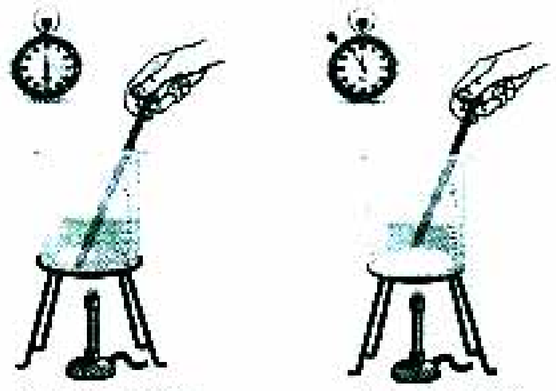
 ....

4 A. Look at the opposite figures, then answer the following.

1. Which beaker contains sodium carbonate solution and which one contains sodium chloride solution?
 (knowing that the sodium chloride dissolves faster than sodium carbonate).

 ....

2. Conclusion: ....



B. Make an activity to prove that temperature affects the solubility process.

 ....

Worksheet (12)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. .... is considered a general solvent because of its ability to dissolve most materials.
2. Mixing a small amount of mud with water forms .... that can be separated by ....
3. Increasing the quantity of a solvent .... solubility time.
4. Increasing .... reduces the solubility time.
5. Increasing the temperature .... solubility time.

B. What happens when...?

1. You have two beakers containing equal amounts of water and equal amounts of sugar, heat one of the two beakers and leave the other without heating.

   ....

2. Increasing the quantity of a solute.

   ....

3. Increasing the quantity of a solvent.

   ....

2 **A. Write the scientific term for each of the following:**

1. The mixture whose components can be distinguished. (....................)
2. The material in which the solute disappears. (....................)
3. The homogeneous liquid mixture. (....................)
4. The substance which dissolves in the solvent. (....................)

B. Which of the following processes takes place faster than the others and why?

1. Dissolving a quantity of salt in hot water or dissolving the same quantity of salt in cold water.

   ....

2. Dissolving a quantity of sugar in water with stirring or dissolving the same quantity of sugar in the same quantity of water without stirring.

   ....

3. Dissolving an amount of salt in 100 ml of water or dissolving the same quantity of salt in 300 ml of water.

....

3 **A. Choose from column (B) what suits in column (A):**

(A)	(B)
1. A solvent	a. are mixtures in liquid states.
2. A solute	b. is a process of separation of the solute from the solvent.
3. Solutions	c. is a substance which exists in a big quantity in the solution.
4. Filteration	d. is a substance which exists in a small quantity in the solution.

1. .... 2. .... 3. .... 4. ....

B. Give a reason for each of the following:

1. A solution is a type of mixtures.

....

2. There are different types of mixtures.

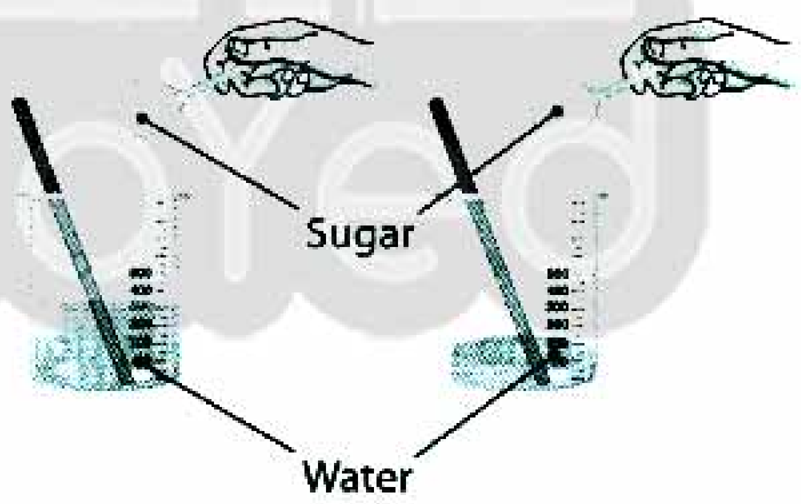
....

3. Water is considered a common solvent.

....

4 **A. Put equal quantities of sugar in different quantities of water in two beakers.**

1. Sugar dissolves faster in the beaker with ....
2. Solubility process .... by increasing the quantity of the solvent.



B. Mention the difference between:

1. A mixture and a solution.

....

2. The natural orange juice and apple juice.

....

3. A solute and solvent.

....

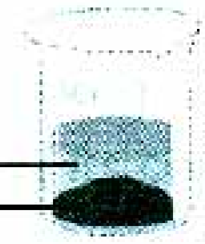
4. Grinding and shaking.

....

TIMSS Like questions on Unit 2

Guide Answers P. 23

1 **The diagram represents a beaker containing sugar, water and sand. The sugar is dissolved in the water, creating a solution. The sand has settled to the bottom of the beaker.**



a. Describe one method to separate the sand from the other substances in the beaker.

....

....

b. Describe one method to separate the dissolved sugar from the sugar-water solution.

....

2 **You have two containers and both of them have the same amount of water.** You add the same amount of sugar to each one. One of the two amounts is powder and the other is cubes. Which one dissolves first? Explain your answer.



....

3 **What is the correct answer to Eslam's question?**

Tick (✓) the correct answer:

1. The water used for dissolving a solid. ☐
2. A solid which dissolves in water. ☐
3. A solid dissolved in water. ☐
4. A solid which does not dissolve in water. ☐



4 **Ali makes a sugary solution by adding sugar to water.**



a. Complete the sentences using either the word solute or solvent in each of the spaces.

Ali leaves the solution he made for a long time in a warm room, and .... evaporates. When all .... has gone, only the .... is left.

b. What is the name of the process used to get the solid back from the solution?

....

c. What happens to the concentration of the sugary solution as the water is removed?

....

5 **Five solids: baking soda, flour, instant coffee, sand and sugar were added to hot water and stirred. The diagrams show what each looked like after the solids had been added to the hot water?**



(A) (B) (C) (D) (E)

a. Which of the solids are in the beakers?

A .... B ....

C .... D ....

E ....

b. Some of the solids dissolve in the hot water. What is the meaning of the word dissolved?

....

c. Which one of the solids reacted with the water and how can you tell it reacted?

....

Al-Adwaa General Tests on Unit 2

Guide Answers P. 23

Test 1

1 **A. Write the scientific term for each of the following:**

1. Disintegration of the solute into particles which spread throughout the solvent. (..............................)
2. It contains more than one type of particles, its components do not join together. (..............................)
3. The process that is used to separate a sugary solution. (..............................)
4. The process that is used for mixing solid substances with liquids. (..............................)

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. A quantity of solvent	a. is a liquid whose components mix together where their particles disintegrate and cannot be seen.
2. A pure substance	b. is used to separate the insoluble solid material from the solution.
3. A solution	c. is among the factors which the rate of dissolution depends on.
4. Filtration	d. is made only of one type of particles.

1. .... 2. .... 3. .... 4. ....

2 **A. Complete the following sentences:**

1. Stirring the solution .... the dissolving time.
2. .... is used for mixing solid materials together with liquids.
3. .... is used to separate solid materials containing iron filings.
4. .... is formed of a solute and a solvent.

B. Choose the correct answer:

1. On the formation of a salty solution (table salt) and leaving it for a period of time, ...

a. nothing happens
b. table salt precipitates
c. water evaporates
d. salt remains

2. It is possible to obtain fresh water from seawater by ....
   a. condensation and then evaporation
   b. melting and then freezing
   c. evaporation and then condensation
   d. freezing and then melting
3. When the amount of solvent increases, the solubility time ....
   a. increases
   b. decreases
   c. no effect
   d. (a) and (b)

3 **A. Give a reason for each of the following:**

1. Solution is a type of mixtures.

   ....

2. Chalk in water is a heterogeneous mixture.

   ....

3. Dissolving sugar in hot water is faster than in cold water.

   ....

B. What is meant by ...?

1. A pure substance. ....
2. A mixture. ....
3. A solid-solid mixture. ....
4. A liquid-liquid mixture. ....

4 **A. What happens when...?**

1. Grinding pepper with salt.

   ....

2. Carbon dioxide gas passes through a sugary solution.

   ....

3. The amount of solute increases.

   ....

4. Stirring a mixture of sugar and water.

   ....

B. Compare between the pure substance, mixture and solution.

Pure substance	Mixture	Solution
....	....	....
....	....	....
....	....	....

Test 2

1 A. Complete the diagram:

Ways to separate mixtures

....	....	....	....
Such as: sand and water	Such as: salt and water	Such as: oil and water	Such as: salt and metal clips

B. Put (✓) in front of the right statement and (✗) in front of the wrong one:

1. Solubility process depends on the solute only. ( )
2. Among the factors affecting solubility process is the quantity of the solute. ( )
3. Green salad is a mixture of solid substances. ( )
4. Increasing the temperature increases dissolving time. ( )
5. Alloys are formed by mixing different metals by fusion and then cooling. ( )

2 A. Mention an example for each type of the following:

1. Solid-solid mixture.

   ....
2. Liquid-liquid mixture.

   ....
3. Gaseous-gaseous mixture.

   ....

B. Write the scientific term for each of the following:

1. The common solvent that has the ability to dissolve several substances. (........................)
2. Leaving an amount of sea water exposed to the sun rays for many days. (........................)
3. The mixture that is formed of a solvent and a solute. (........................)
4. The process that is used to separate the insoluble solid materials in the solution. (........................)

3 A. Give a reason for each of the following:

1. Both distilled water and salt are pure substances.

   ....

2. Milk and tomato sauce are mixtures.

....

3. Air is considered a gaseous-gaseous mixture.

....

4. Heterogeneous mixture is formed by adding sand to water.

....

B. Compare between the solute and the solvent:

Solute	Solvent
....	....

4 **A. What happens when ...?**

1. Salty water is left for a long time.

....

2. The amount of a solvent increases.

....

3. The temperature of a solvent increases.

....

4. Mixing different juices together.

....

B. What is meant by ...?

1. A solvent.

....

2. A solute.

....

3. A solution.

....

4. Solubility process.

....

Test 3

1 **A. How to separate the following mixtures:**

1. A solution of mud and water.

....

2. A solution of oil and water.

....

3. A sugary solution.

....

B. Write the scientific term for each of the following:

1. The process by which a solute dissolves in a solvent. (..............................)
2. The homogeneous liquid mixture. (..............................)
3. The substance that is made of one type of particles. (..............................)
4. The way that is used to form a salty solution. (..............................)

2 **A. Choose the correct answer:**

1. .... is a way used to separate a mixture which has precipitates.
   a. Filtration b. Evaporation c. Separating funnel
2. The substance which dissolves on the formation of solution is called ....
   a. solute b. solvent c. solubility
3. Among the the factors affecting the solubility process is ....
   a. evaporation b. filtration c. temperature

B. What happens when ...?

1. Adding salt to water and stirring.

....

2. Putting a magnet near a mixture of iron filings and salt.

....

3. Mixing different metals with each other by fusion and then cooling.

....

4. Putting two equal amounts of sugar and salt in two beakers containing the same amount of water.

....

3 **A. What is meant by ...?**

1. A mixture.

....

2. A homogeneous mixture.

....

3. A heterogeneous mixture.

....

B. Put (✓) in front of the right statement and (✗) in front of the wrong one:

1. We use the filtration process to separate mixtures which have deposits. (   )
2. We can use evaporation process to separate crushed coffee from water. (   )
3. The solubility speed of solids increases by grinding. (   )
4. Solute + solvent $\xrightarrow{\text{solubility process}}$ solution. (   )

4 **A. Compare between a homogeneous mixture and a heterogeneous mixture:**

Homogeneous mixture	Heterogeneous mixture
....	....
....	....
....	....

B. Give a reason for each of the following:

1. Adding sand to water is considered a heterogeneous mixture.

....

2. Air is a mixture.

....

3. Water is considered a common solvent.

....

4. It is better to dissolve sugar in water by heating and stirring.

....

Unit 3 Environmental Balance

Lesson 1 Food relationships among living organisms

(Guide Answers P. 24)

Worksheet (13)

(Total marks: 20)

1 A. Complete the following sentences:

1. From the food relationships are ……………, …………… and predation.
2. …………… is the main source of energy for living organisms.
3. The relationship between a lion and a deer is ……………, while the relationship between leguminous plants and nodular bacteria is …………… .
4. Green plants are …………… as they make their own food by …………… .
5. Among the insectivorous plants are ……………, …………… and …………… .

B. What is meant by ...?

1. Autotrophic organisms. …………………………………… .
2. Predation. …………………………………… .
3. A predator. …………………………………… .
4. A prey. …………………………………… .

2 A. Write the scientific term for each of the following:

1. A temporary food relationship between two living organisms that ends by devouring the prey. (……………)
2. The animal that ejects a black fluid in water to hide from enemies. (……………)
3. The animal that changes its color to be like the surrounding environment. (……………)
4. Organisms that get food from dead bodies. (……………)
5. The relationship between nodular bacteria and legumes. (……………)

B. Correct the underlined words:

1. Green plants are <u>heterotrophic</u> organisms. (……………)
2. The <u>frog</u> ejects a fluid in the surrounding water to hide from enemies. (……………)

3. The strong organism in a predation relationship is called a prey. (....................)
4. Camouflage, mimicry and hiding are some ways of self-defence against parasitism. (....................)

3 **A. Give a reason for each of the following:**

1. Plants are the main source of food for lions although lions are carnivorous.
....
2. Some plants feed on insects.
....
3. Predation is less common in plants.
....
4. The bean plant does not need nitrogenous fertilizers.
....
5. Drosera is from the insectivorous plants.
....

B. Compare between camouflage and mimicry.

Points of comparison	Camouflage	Mimicry
Definition	....	....
Example	....	....

4 **A. What happens if ...?**

1. The honeybee does not look like wasps.
....
2. Green plants cannot make photosynthesis.
....

B. Explain in detail an example of mutualism.

....
....
....

Worksheet (14)

(Total marks: 20)

1 **A. Complete the following sentences:**

1. Spiders make webs to catch ....
2. The color of a butterfly being like that of a tree is considered a ....
3. The types of food relationships are ...., symbiosis, and ....
4. A lion feeds on green plants ....

B. Give a reason for each of the following:

1. A chameleon can hide from its enemies.

....

2. A host's death is considered a loss to a parasite.

....

3. Mosquitoes and lice are external parasites.

....

4. Bread mold, mushroom and penicillium fungi are saprophytes.

....

2 **A. Choose the correct answer:**

1. The food relationship which ends quickly is called ....
   a. parasitism b. saprophytism c. commensalism d. predation
2. Useful living organisms living on the roots of bean plant are ....
   a. fungus b. algae c. nodular bacteria d. viruses
3. The process of photosynthesis is done by a .... living organism.
   a. producer b. consumer c. decomposer d. saprophyte
4. The fungus which decomposes orange fruit is called ....
   a. mushroom b. taenia c. penicillium d. ascaris

B. What happens when ...?

1. Leaving moist bread in a closed sac.

....

2. Absence of saprophytes.

....

3. An enemy attacks sepia.

....

4. A chameleon does not simulate its surrounding environment.

....

3 **A. Correct the underlined words:**

1. Halophila feeds on insects to get the required elements for making carbohydrates. (..................)
2. The relation between the sponge and tiny aquatic living organisms is predation. (..................)
3. Some bees look like wasps as a form of camouflage. (..................)
4. Mosquitoes make webs to catch insects. (..................)

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. An example of predation	a. Nodular bacteria and leguminous plants.
2. An example of external parasite	b. Bilharzia worm and man.
3. An example of internal parasite	c. Bacteria and bodies of dead organisms.
4. An example of saprophytism	d. Man and lice.
5. An example of mutualism	e. Cats and mice.

1. .... 2. .... 3. .... 4. .... 5. ....

4 **A. Put (✓) in front of the correct statement and (X) in front of the incorrect statement and correct it:**

1. Filarial worm, tapeworm and ascaris worm are external parasites. ( )
2. The relationship between filarial worm and man is parasitism. ( )
3. Mutualism and commensalism are the two types of symbiosis only. ( )
4. Predation is a temporary relationship between a predator and a prey. ( )

B. 1. What is the benefit of ...?

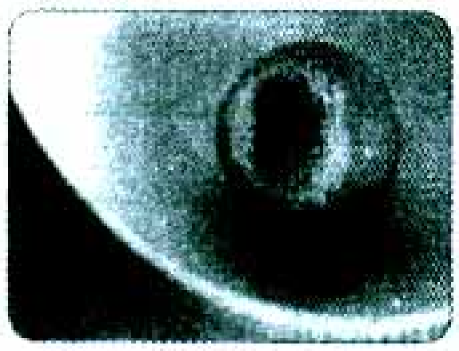
a. Tiny aquatic organisms from sponge.

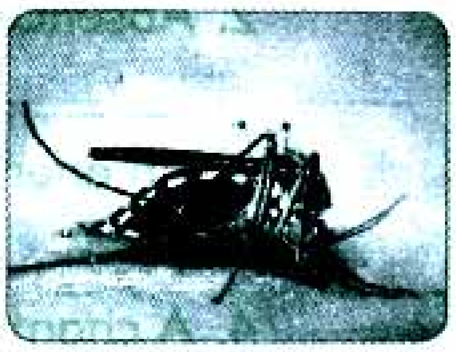
....

b. Bacteria in man's intestine.

....

2. Show the food relationships in the following figures:



1. .... 2. .... 3. .... 4. ....

Lesson 2 Environmental balance

Worksheet (15)

(Guide Answers P. 25)

(Total marks: 20)

1 A. Complete the following sentences:

1. .... is a natural area that contains living organisms and non-living things.
2. The ocean is a .... ecosystem.
3. The non-living components of an ecosystem are air, ... and soil.
4. Plants depend on .... to absorb water and salts.
5. The .... disappeared in ancient eras due to change in natural conditions.

B. Explain the relation between each of the following:

1. Plants & animals.
2. Fungus & animals.

2 A. Choose the correct answer:

1. A water pond is considered a .... ecosystem.
   a. small b. large c. very large d. huge
2. An ecosystem consists of ....
   a. living organisms b. non-living things c. both of them (a,b) d. none of them
3. The disappearance of dinosaurs was due to ....
   a. the change in natural conditions b. man interference c. (a, b) d. none of them
4. Predation .... the numbers of prey populations.
   a. organizes b. recycles c. gets rid of d. removes
5. Eroding the soil leads to the ....
   a. environmental balance b. environmental imbalance c. soil fertility d. increased crops

B. What is the effect of saprophytism relationship on the environmental balance?

....

....

....

3 **A. Write the scientific term for each of the following:**

1. The natural area which includes living organisms and non-living organisms. (..................)
2. The relationship that helps the prey populations to get rid of weak or sick members. (..................)
3. The balance among the components of the ecosystem. (..................)
4. A very large ecosystem. (..................)

B. Give a reason for each of the following:

1. Plants absorb water and salts from soil.
   ....
2. Saprophytes complete food chains and webs.
   ....
3. Saprophytes have an important role in industry.
   ....
4. There is a continuous interaction among environmental components.
   ....

4 **A. What happens in case of ...?**

1. Killing the American hawks.
   ....
2. Introducing rabbits to an island with no natural enemies.
   ....
3. Cutting down trees by man.
   ....
4. Chemical elements are not recycled by saprophytic organisms in an ecosystem.
   ....

B. Correct the underlined words:

1. <u>The environmental balance</u> is any natural area including living organisms and non-living things. (..................)
2. The interaction among the environment components is a <u>stopped</u> process. (..................)
3. The disappearance of huge <u>birds</u> in ancient eras was due to natural changes. (..................)
4. Absence of predators increases the numbers of <u>saprophytes</u>. (..................)

Worksheet (16)

(Total marks: 20)

1 **A. Choose the correct answer:**

1. All the following are components of a desert ecosystem except the ....
   a. deer b. cactus c. shark d. snake
2. Without the saprophytic organisms, the earth's surface would be covered by bodies of ....
   a. plants b. animals
   c. living organisms d. dead organisms
3. The predation relationship .... the numbers of prey populations.
   a. increases b. organizes c. decreases d. presents
4. Saprophytic organisms .... the chemical elements within the ecosystem.
   a. provide b. save c. keep d. recycle

B. What is the effect of each of the following on the environmental balance?

1. Saprophytism.

   ....
2. Predation.

   ....

2 **A. Put (✓) in front of the right statement and (✗) in front of the wrong one and correct it:**

1. Interaction among the components of the environment leads to imbalance in the ecosystem. (   )

   ....
2. Lions are examples of extinct animals due to a change in the natural conditions of the environment. (   )

   ....
3. The balance of the ecosystem occurs due to man's interference. (   )

   ....
4. Change in natural conditions leads to the environmental balance. (   )

   ....
5. The predation relationship keeps the balance within the ecosystem. (   )

   ....

B. Give a reason for each of the following:

1. The extinction of dinosaurs in ancient ages.
   ....
2. Plants are called autotrophic organisms.
   ....
3. A competition may appear among prey populations in an ecosystem.
   ....

3 A. Correct the underlined words:

1. <u>Saprophytism</u> gets rid of weak or sick preys. (..............................)
2. The interaction among the environmental components is a <u>stopped</u> process. (..............................)
3. Animals feed on plants to get food and <u>oxygen</u>. (..............................)
4. A water pond is a <u>large</u> ecosystem. (..............................)

B. Write the scientific term for each of the following:

1. The organisms which organize the numbers of prey populations in the ecosystem. (..............................)
2. The phenomenon that appears among prey populations due to the food shortage. (..............................)
3. The organisms which clean the earth's surface from dead bodies. (..............................)

4 A. Define:

1. The ecosystem.
   ....
2. The environmental balance.
   ....

B. How does man get benefit from saprophytes in industry?

....

....

....

TIMSS Like questions on Unit 3

Guide Answers P. 25

1 **Match each word to its meaning:**

1. Camouflage
2. Mutualism
3. Commensalism
4. Parasitism
5. Saprophytism

a. A food relationship in which the decomposers get their food by decomposing food remains or bodies of dead organisms.

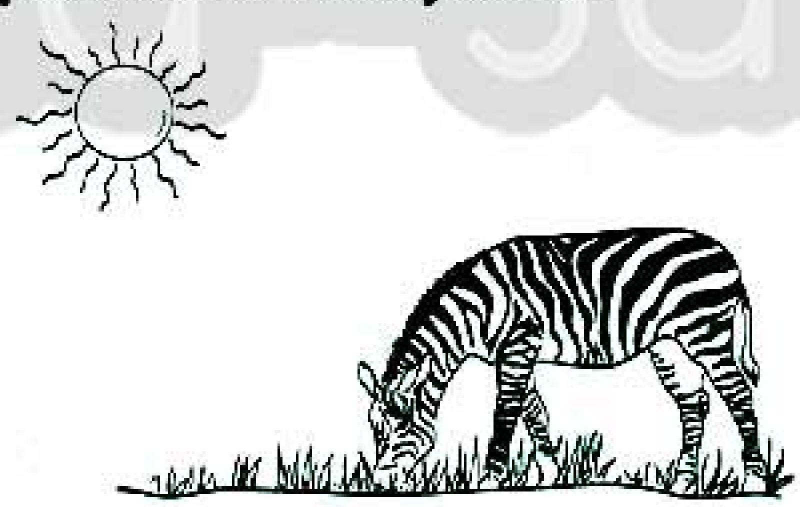
b. A phenomenon in which a living organism can change its color to simulate the colors of the environment to hide from enemies.

c. A food relationship between two living organisms in which one of them benefits, while the other neither gets benefit nor is harmed.

d. A food relationship between two living organisms and both get benefits.

e. A food relationship between two living organisms, one benefits from the other known as a parasite and the other one is harmed known as a host.

2 **The figure shows some parts of an ecosystem:**



a. (i) In what form is energy passed from the sun to the grass?

....

(ii) In what form is energy passed from the grass to the zebra?

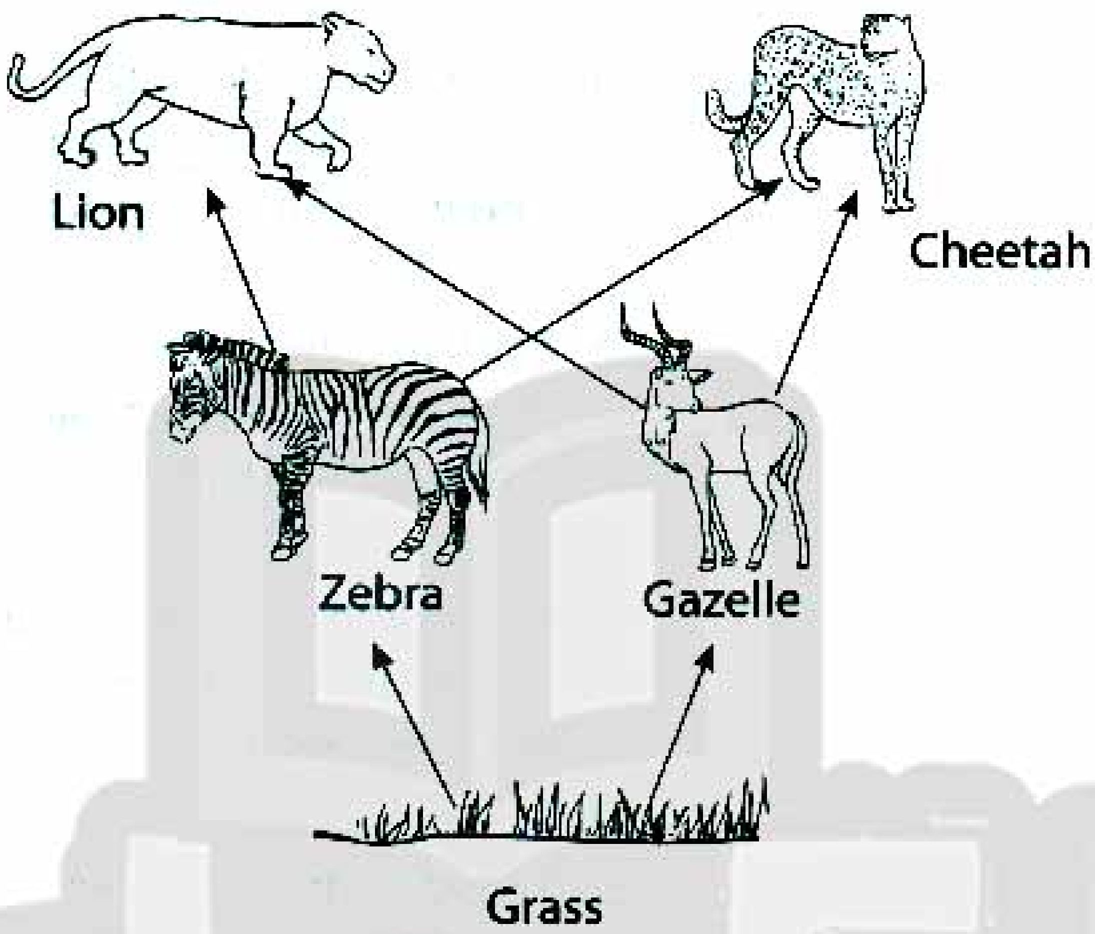
....

b. When the zebra dies, the energy in its body is released by decomposers.

- Name one group of microorganisms involved in the process.

....

3 **The diagram shows part of food web:**



a. (I) What do the arrows on the food web show?

....

(ii) Which of the organisms in this web compete for grass?

....

(iii) Which of the organisms in this web are predators?

....

b. Hyenas are scavengers. They eat the parts of dead zebras and gazelles which other animals have not eaten. Use this information to add hyenas into the food web above.

....

4 **Put these words in the right places:**

(mimicry - parasite - host - bug - filarial worm)

1. A .... benefits from the other and the other one is harmed.
2. A .... is harmed and infected by diseases.
3. .... is considered internal parasitism.
4. .... is considered external parasitism.

Al-Adwaa General Tests on Unit 3

Guide Answers P. 25

Test 1

1 **A. Complete the following sentences:**

1. Predation is less common in the .... world than in the animal world.
2. Some animals feed on other animals to get food and ....
3. A butterfly uses .... as it stands on a tree with a similar color.
4. .... make weaves to catch insects.

B. Put (✓) in front of the right statement and (X) in front of the wrong one:

1. The devoured animal is the predator. ( )
2. Penicillium recycles carbon, nitrogen and sulphur in orange fruit. ( )
3. Saprophytes are used in cheese industry. ( )
4. Fleas cause malaria disease. ( )
5. Predators organize the numbers of preys. ( )

2 **A. Choose the correct answer:**

1. The jawless lamprey is the ....
   a. host b. parasite c. saprophyte d. decomposer
2. Lice are ....
   a. internal parasites b. external parasites
   c. decomposers d. predators
3. Nodular bacteria fix nitrogen in a/an .... form to provide the plant with.
   a. organic b. inorganic c. living d. non-living
4. Death of the host is a great loss for the ....
   a. parasite b. saprophyte c. prey d. predator
5. Predation is a .... process.
   a. permanent b. temporary c. continuous d. long time

B. Mention the food relation between:

1. Lions and zebras. ....
2. Nodular bacteria and leguminous plants. ....
3. Bread mold and bread. ....

4. Ticks and dogs. ....
5. Mosquito and man. ....

3 **A. Write the scientific term for each of the following:**

1. The food relationship in which one organism benefits from the other whereas the other is harmed. (..........................)
2. The disease that is caused by ascaris worm. (..........................)
3. Plants which devour tiny insects. (..........................)
4. A balance among the components of the ecosystem. (..........................)

B. What is meant by ...?

1. Predation. ....
2. The predator. ....
3. The host. ....
4. External parasitism. ....

4 **A. Give a reason for each of the following:**

1. Predation is less common in the plant world.
....
2. The food relationship between lions and deers is predation.
....
3. A butterfly stands on a tree with a similar color.
....
4. A chameleon simulates the color of its surrounding environment.
....

B. Compare between commensalism and mutualism:

Commensalism	Mutualism
....	....
....	....
....	....

Test 2

1 A. Complete the following sentences:

1. Saprophytes get rid of .... bodies.
2. Bugs are .... parasites.
3. Aquatic living organisms get food and .... from canals and .... of the sponge.
4. .... and .... are saprophytes.

B. Choose the correct answer:

1. The food relationship between a tiger and a deer is ....
   a. symbiosis b. saprophytism c. predation d. parasitism
2. .... suck blood of fish.
   a. Bugs b. Fleas c. Ticks d. Jawless lampreys
3. Ascaris worm causes ....disease.
   a. anemia b. bilharziasis c. elephantiasis d. malaria
4. .... fungus decomposes orange fruit.
   a. Mushroom b. Bread mold c. Penicillium d. Yeast

2 A. Correct the underlined words:

1. <u>Predators</u> are the guards of nature. (....................)
2. <u>Parasites</u> are used in leather tanning industry. (....................)
3. <u>Herbivores</u> are autotrophic organisms. (....................)
4. Plants depend on <u>air</u> to get water and salts. (....................)
5. The interaction among the components of the ecosystem is <u>temporary</u>. (....................)

B. Give a reason for each of the following:

1. Predation is a temporary process.
   ....
2. Dionaea feed on insects.
   ....
3. The spider is a predator.
   ....

3 **A. Compare between the effect of predation and saprophytes on the environmental balance.**

Predation	Saprophytism
....	....
....	....
....	....

B. What is meant by ...?

1. Mimicry.

....

2. Symbiosis.

....

3. Mutualism.

....

4. Prey.

....

4 **A. What happens when ...?**

1. The leguminous plants have no nodular bacteria in their roots.

....

2. A mosquito stands on your skin.

....

3. Chemical elements are not recycled by saprophytic organisms in the ecosystem.

....

4. Natural changes take place within the ecosystem.

....

B. Put (✓) in front of the right statement and (X) in front of the wrong one:

1. The relationship between cat and rat is predation. (   )
2. Some living organisms can change their color to hide from their enemies. (   )
3. Lions, tigers and sharks are predators. (   )
4. The balance of the ecosystem occurs due to the interference of man. (   )

Test 3

1 A. Complete the following sentences:

1. Halophila is an .... plant.
2. Legumes have .... bacteria in their roots.
3. Camouflage and mimicry are ways of self-defence against ....
4. Ascaris worm is an .... parasite.
5. Some autotrophic plants prey on insects to get the required elements for making ....

B. Choose the correct answer:

1. Parasites do not kill the ....
   a. predator b. saprophyte c. prey d. host
2. Mushrooms are ....
   a. predators b. parasites c. saprophytes d. preys
3. Lions are ....
   a. autotrophic b. parasites c. saprophytes d. predators
4. .... is an insect-eater plant.
   a. Ascaris b. Bean c. Drosera d. Mushroom
5. Food chains and webs end by ....
   a. predators b. saprophytes c. parasites d. preys

2 A. What happens if ...?

1. Cutting down of trees.

....

2. Rabbits are introduced into an island with no natural enemies.

....

3. Killing the American hawks.

....

B. Write the scientific term for each of the following:

1. The natural area that includes living organisms together with non-living things. (....................)
2. The food relationship between two organisms and both get benefits. (....................)
3. The organism that decomposes the orange fruit. (....................)

4. The parasite that causes smallpox. (..............................)
5. The insect that causes malaria disease. (..............................)

3 A. Compare between parasitism and commensalism according to definition and give an example.

P.O.C.	Parasitism	Commensalism
Definition	....	....
Example	....	....

B. What is meant by ...?

1. Internal parasitism.

....

2. Saprophytism.

....

3. The ecosystem.

....

4. The environmental balance.

....

4 A. Give a reason for each of the following:

1. A chameleon can hide from enemies.

....

2. The food relationship between tiny aquatic organisms and the sponge is commensalism.

....

3. The food relationship between nodular bacteria and leguminous plants is mutualism.

....

4. The parasitism relationship differs from the predation relationship.

....

B. Put (✓) in front of the right statement and (✗) in front of the wrong one and correct it:

1. Commensalism ends by killing the prey or part of it. (   )
2. Ecosystem may be as large as the ocean. (   )
3. Man interference causes the environment balance. (   )

School Exams on the First Term 2016/2017

Note: the questions marked by (★) belong to the first part of the first term. (Guide Answers P. 28)

1 Cairo – Cairo Experimental Educational Zone

1 A. Complete the following sentences:

1. Bees which look like wasps undergo .... phenomenon but chameleon undergoes .... phenomenon to protect themselves from their enemies.
2. ★ A huge dynamo is used to generate a large amount of electricity used for .... and ....
3. ★ The magnet has the most powerful attraction at its ....

B. ★ What is meant by magnetic field?

2 A. Put (✓) in front of the correct statements and (✗) in front of the false ones:

1. ★ Aluminum is attracted to the magnet. (   )
2. Lice, bugs and ascaris worm are external parasites. (   )
3. We can use the evaporation process to separate crushed coffee from water. (   )
4. ★ Magenta is a secondary light color. (   )

B. Give one example for each of the following:

1. ★ A source of light
....
2. A method of forming mixture
....

3 Write the scientific term for each of the following:

1. Substances made of more than one type of particles. (....................)
2. The organisms which clean the earth's surface from dead bodies. (....................)
3. ★ It is the change in the path or direction of light when it passes from air to water. (....................)
4. A method used to form salt-pepper mixture. (....................)

4 A. Choose the correct answer in each of the following:

1. Table salt is collected by evaporation of ....
   a. distilled water b. mineral water
   c. seawater d. all the previous answers
2. ★ Light is reflected .... when it falls on a smooth and shiny reflecting surface.
   a. regularly b. irregularly c. and refracted d. and scattered

3. ★ .... is considered a primary light color.

a. Yellow b. Red c. Magenta d. Cyan

4. The relation between cat and rat is ....

a. predation b. mutualism c. commensalism d. saprophytism

B. Give a reason for each of the following:

1. Water is considered a common solvent.

....

2. ★ Some materials are called non-magnetic materials.

....

2 Cairo – Experimental L. S.

1 A. Complete the following sentences:

1. ★ The tissue paper is an example of .... materials, while a piece of rock is an example of .... materials.
2. ★ The like poles .... each other, whereas the unlike poles .... each other.
3. The relationship between nodular bacteria and plants is an example of .... relationship.
4. Solubility time decreases by .... the temperature of the solution.

B. Mention one use for each of the following:

1. Separating funnel

....

2. ★ Compass

....

2 A. Write the scientific term for each of the following:

1. ★ The materials that are not attracted to the magnet. (....................)
2. ★ The space around the magnet in which its magnetic force appears. (....................)
3. It is a food relationship among living organisms in which one living organism devours another one. (....................)
4. It is any natural area including living organisms and nonliving things. (....................)
5. It is the substance which dissolves in a solvent. (....................)

B. What happens when ...?

1. ★ The blue color is mixed with red color.

....

2. Bacteria completely disappear.

....

3 **A. Correct the underlined words in the following statements:**

1. ★ Light travels in curved lines. (....................)
2. ★ Light rays reflect in different directions in the regular reflection. (....................)
3. ★ Mixing green and blue colors produces red color. (....................)
4. Mushroom is from internal parasites. (....................)
5. We separate between salt and water by magnetic attraction. (....................)

B. Give a reason for each of the following:

1. The frog changes its color.

....

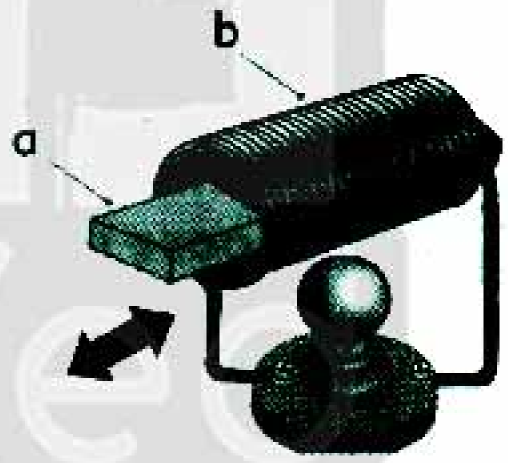
2. ★ A spoon appears broken when you put it in a transparent cup of water.

....

4 **A. Choose the correct answer:**

1. The process of photosynthesis is done by a (producer - decomposer - consumer) living organism.
2. Among the insectivorous plants is (bean - sunflower - drocera).
3. (Mimicry - Commensalism - Camouflage) is the ability of some living organisms to change their color.
4. ★ Milk, concrete and tomato sauce are considered a (mixture - pure substance - solution).

B. ★ Look at the following figure, then complete:



a. .... b. ....

1. This figure represents ....
2. The apparatus is used to change .... energy into .... energy.

3 Cairo – Public L . S.

1 **A. Complete the following sentences:**

1. ★ Mixing .... and .... colors produces magenta.
2. Solution consists of .... and ....
3. Among the types of symbiosis are .... and ....
4. ★ The like poles ...., while the unlike (different) poles ....

B. Write the scientific term for each of the following:

1. ★ The area in the magnet, where the magnetic force is the most. (....................)
2. The animal which devours another animal. (....................)
3. The substance that contains only one type of particles. (....................)
4. ★ The tool (device) that converts electric energy into magnetic energy. (....................)

2 **A. Choose the correct answer:**

1. ★ The yellow glass (absorbs - reflects - transmits) the yellow color.
2. Bee protects itself against predation through (camouflage - mimicry - parasitism).
3. Among the living components of the ecosystem is (plant - soil - water).
4. ★ The image in narrow holes is small and (upright - inverted - refracted).

B. Correct the underlined words in the following statements:

1. ★ We use dynamo in making electric bell. (..................)
2. Sugar in a sugary solution is the solvent. (..................)
3. In parasitism the living organism which is hurt is called parasite. (..................)
4. ★ Opaque material allows most light to pass through. (..................)

3 **A. Put (✓) in front of the correct statements and (X) in front of the false ones:**

1. ★ Compass is used to locate the main four directions. (   )
2. ★ The area around the magnet, where its effect appears, is the magnetic field. (   )
3. ★ Light travels in curved lines. (   )
4. Desert is a large ecosystem. (   )
5. When the temperature increases, the solubility time decreases. (   )
6. ★ Electric current has a magnetic effect. (   )

B. Give a reason for each of the following:

1. ★ We increase the number of batteries in making electromagnet.
2. Formation of shadow.

4 **A. Choose from column (B) what suits in column (A):**

(A)	(B)
1. Among the methods of making mixtures is	a. non-magnetic.
2. ★ Materials that are not attracted to magnet are called	b. using a magnet.
3. ★ Materials attracted to magnet are called	c. shaking.
4. Among the methods of separating mixtures is	d. magnetic.

1. .... 2. .... 3. .... 4. ....

B. Use the following words to fill the spaces:

predation - parasitism - saprophytism - mutualism

1. It is a temporary relationship that ends by devouring the prey or a part of it ....
2. It is a type of relationship from which both living organisms get benefit ....
3. It is the relationship between two different kinds of living organisms where one benefits and the other is harmed ....
4. The relation between bread and bread mold fungus is called ....

4 Cairo – Maadi Educational Directorate

1 Complete the following sentences:

1. ★ .... and .... are examples of transparent materials.
2. ★ The primary color lights are red, ... and ....
3. ★ Among the devices which use the electromagnet are .... and ....
4. Solid and liquid materials can be mixed by .... or ....

2 A. Choose the correct answer:

1. ★ The pen seems broken in a glass filled with water due to (light reflection - light refraction - light separation).
2. (Evaporation - Filtration - Separating funnel) is used to separate a mixture of oil and water.
3. Among the examples of pure substances is (distilled water - concrete - milk).
4. The food relationship between nodular bacteria and bean plant is an example of (predation - mutualism - parasitism).

B. What happens when ...?

1. ★ Mixing the red light with the blue light.
2. ★ The north pole of a magnet comes nearer to the south pole of another magnet.

3 A. Write the scientific term for each of the following:

1. ★ The space around the magnet in which the magnetic force appears. (....................)
2. Any natural area including living organisms and non-living things. (....................)
3. ★ The device that changes the mechanical energy into electric energy. (....................)
4. ★ The darkened area which is formed as a result of falling of light on an opaque object. (....................)

B. Give a reason for each of the following:

1. ★ Copper and aluminum are among the nonmagnetic materials.
2. Cuttlefish ejects black fluid in water when it is attacked by enemies.

4 A. Put (✓) in front of the right sentence and (✗) in front of the wrong sentence:

1. ★ Light travels in curved lines. (   )
2. Water is called a common solvent. (   )
3. ★ The electromagnet loses its magnetic force by cutting the electric current. (   )
4. Dinosaur is an example of the extinct animals due to changing of the natural conditions in the environment. (   )
5. Stirring decreases the solubility speed. (   )

B. Match from column (A) what suits in column (B):

(A)	(B)
1. Filaria worms (..............)	a. convey smallpox
2. Mosquitoes (..............)	b. cause elephantiasis
3. Fleas (..............)	c. cause malaria
	d. cause bread mould

5 Cairo - Science Inspectorate

1 A. Complete the following:

1. ★ Light can pass easily through ....
2. ★ The like poles .... while the unlike poles ....
3. ★ Prism separates white light into .... colors .
4. Mixtures can be formed by shaking or ....

B. Put (✓) or (✗) :

1. Ascaris worm causes anemia. ( )
2. Salty solution can be separated by using a magnet. ( )
3. ★ Light is a form of energy. ( )

2 A. Write the scientific term for each of the following:

1. ★ The bouncing of light rays. (..................)
2. ★ The two ends of the magnet. (..................)
3. The natural area that contains living and non-living things. (..................)
4. ★ A set used for locating the four geographical directions. (..................)
5. A darkened area formed when light falls on an opaque object. (..................)

B. Give a reason for each of the following:

1. ★ Aluminum is a nonmagnetic material.
2. ★ The green color is a primary color.

3 A. Choose the correct answer:

1. ★ Coil of dynamo is made of (plastic - copper - wood).
2. ★ Light can't pass through (glass - transparent - opaque) materials.
3. ★ (Iron - Wood - Air) is a magnetic material.
4. ★ (White - Black - Red) opaque bodies reflect all light colors.
5. In salty solution, salt is a (solvent - solute - ray).

B. Give one example for:

1. A predator.
2. A solid-liquid mixture.

4 **A. Correct the underlined words in the following statements:**

1. ★ Cyan and magenta are primary colors. (............)
2. Solubility speed decreases by stirring. (............)
3. Air is a pure substance. (............)
4. ★ Red + green + blue = cyan light. (............)
5. Evaporation is used to separate sand from water. (............)

B. Cross the odd word out:

1. ★ iron - nickel - paper (............)
2. ★ glass - air - carton (............)
3. fungi - butterfly - bacteria (............)

6 Cairo - East Nasr City Edu. Zone - El-Manhal Lang. School

1 **A. Choose the correct answer:**

1. ★ The different magnetic poles .... each other.
   a. attract b. repel c. like
2. ★ The electromagnet changes electric energy into .... energy.
   a. kinetic b. magnetic c. thermal
3. The relationship between wolf and sheep is ....
   a. mutualism b. parasitism c. predation
4. To separate a mixture of sand and iron filings use ....
   a. filtration b. magnetic attraction c. shaking

B. Put (✓) or (✗):

1. ★ Electric bell contains dynamo. ( )
2. Solubility speed is not affected by stirring. ( )
3. Bacterium is a decomposer. ( )
4. ★ Light travels in straight lines. ( )

2 **A. Write the scientific term for each of the following:**

1. The relation between two organisms that benefit from each other. (............)
2. ★ The space around the magnet in which the magnetic force appears. (............)
3. ★ The materials behind which you can see objects clearly. (............)
4. A set used to separate the oil form oil-water mixture. (............)
5. ★ The materials which are attracted to the magnet. (............)
6. The natural area including living organisms and nonliving organisms. (............)

B. Give a reason for each of the following:

1. ★ The red apple is seen red.
2. Milk is a mixture.

3 Complete the following sentences:

1. A mixture can be formed by .... and ....
2. ★ .... , ... and magenta are secondary light colors.
3. ★ As the light falls on the green grass, it absorbs .... colors except ....
4. ★ Dynamo changes from .... energy to .... energy.
5. ★ Red light + ... + ... forms white color.
6. .... is one of the animal predators, while .... is one of the insectivorous plants.
7. The solution consists of .... and ....

4 A. Correct the underlined words in the following statements:

1. ★ The magnet is most powerful at the <u>middle</u>. (....................)
2. Chameleon hides from its enemies by <u>saprophytism</u>. (....................)
3. ★ The <u>opaque</u> materials allow some of light to pass through them. (....................)
4. Bilharzia and liver worm are <u>external</u> parasites. (....................)

B. ★ Choose from column (B) what suits in column (A):

(A)	(B)
1. Spectrum colors.	a. The relation between decomposers and dead bodies.
2. Saprophytism.	b. A transparent material.
3. Water	c. It causes malaria.
4. Mosquito	d. The seven colors which the sunlight is made up of.

7 Giza - North Giza Educational Directorate

1 A. Complete the following sentences:

1. ★ Light travels in .... lines.
2. ★ .... is the space around the magnet where its magnetic force appears.
3. .... is the solvent in chocolate milk solution.
4. ★ Electromagnet changes .... energy into .... energy.
5. ★ .... is the darkened area formed as a result of light falling on an opaque object.
6. Bilharzia worms are .... parasites.

B. ★ What is the importance of magnetic compass?

2 A. Correct the underlined words in the following statements:

1. ★ <u>Like</u> magnetic poles attract each other. (....................)
2. The relation between lion and deer is <u>symbiosis</u>. (....................)
3. ★ Wood and carton are <u>transparent</u> materials. (....................)
4. ★ Spectrum colors start with <u>orange</u>. (....................)

B. Mention the kind of food relationship between:

1. Nodular bacteria and bean plant.
2. Mosquito and human.

3 A. Give a reason for each of the following:

1. Air is a mixture.
2. ★ Iron is a magnetic material.

B. Choose the correct answer:

1. ★ (Glass prism - Magnet - Mirror) is a device that separates white light into seven spectrum colors.
2. ★ Red, green and blue are (secondary - primary - complementary) light colors.
3. Green plants are (producers - consumers - decomposers).
4. ★ (Iron - Wood - Plastic) is a magnetic material.

4 A. Write the scientific term for each of the following:

1. ★ The materials that allow some light to pass through. (..................)
2. The process of heating a salty solution to separate salt from water. (..................)
3. ★ A beautiful phenomenon that appears in the sky after rains. (..................)
4. The animal which devours another animal. (..................)

B. How can you separate the following mixtures...?

1. A mixture of iron filings and sand.
2. A mixture of oil and water.

8 Qalubia - Science Inspectorate

1 A. Choose the correct answer:

1. ★ Light transmits in (curved - broken - straight - zigzag) lines.
2. ★ The materials which let most light pass through are called (transparent - translucent - semi-transparent - opaque).
3. ★ All the following colored lights are primary except (yellow - green - red - blue).
4. Mosquitoes cause (elephantiasis - smallpox - malaria - bilharziasis) disease to man.
5. Without the saprophytic organisms earth's surface would be covered with (plants - living organisms - animals - dead organisms).
6. ★ When you look at a red apple from a yellow glass sheet, the apple seems (black - red - blue - yellow).

B. Give a reason for each of the following:

1. ★ A spoon appears broken when you put it in a transparent cup of water?
2. Air is a mixture.

2 **A. Complete the following sentences:**

1. ★ Like magnetic poles .... whereas unlike poles ....
2. Methods of formation of a mixture are shaking, ... and ....
3. ★ The electromagnet converts .... energy into .... energy.
4. ★ Red light + ... + ... forms white light.
5. Solution is a mixture that consists of .... and ....
6. Types of food relationships between living organisms include predation, ... and ....

B. Mention one use for each of the following:

1. ★ Electric generator (dynamo).
2. ★ Electromagnet.

3 **A. Write the scientific term for each of the following:**

1. ★ A darkned area formed behind an object once light falls on it. (....................)
2. ★ The space around a magnet in which the magnetic force appears. (....................)
3. A natural area including living organisms and non-living things. (....................)
4. A food relationship in which an organism devours the other. (....................)
5. ★ The materials that get attracted to the magnet. (....................)
6. ★ The color produced by mixing red and green colors. (....................)

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. Sand and water.	a. get separated by a magnet.
2. Oil and water.	b. get separated by evaporation.
3. Paper clips and sand.	c. get separated by separating funnel.
4. Salt solution.	d. get separated by filtration.

4 **A. Correct the underlined words in the following statements:**

1. Milk is a pure <u>substance</u>. (....................)
2. <u>Oil</u> is a common solvent. (....................)
3. ★ When the light falls on a mirror, it gets <u>refracted</u>. (....................)
4. Ascaris worm is an <u>external</u> parasite. (....................)
5. ★ Magnetic force is concentrated at the <u>middle</u> of the magnet. (....................)
6. Salty solution is a <u>heterogeneous</u> mixture. (....................)

B. Choose the odd word out, then mention the scientific term for the others:

1. (Flaria worm - Mosquito - Liver worm - Bilharzia worm) (....................)
   a. Odd word: .... b. Scientific term: ....
2. (Chameleon - Butterfly - Cuttlefish - Drosera) (....................)
   a. Odd word: .... b. Scientific term: ....

9 Menofia - Shebeen El-Koom Directorate

1 Complete the following sentences:

1. ★ We can see .... in the sky while the rain falls.
2. ★ The basic idea of the electric generator is the changing of .... energy into .... energy.
3. ★ The image formed by the narrow holes is .... and ....
4. .... is used to separate a mixture of sand and iron filings.
5. .... and .... are among the ways of self-defence against predation in living organisms.

2 A. Write the scientific term for each of the following:

1. ★ The materials that are attracted to the magnet. (..................)
2. It contains more than one type of particles. (..................)
3. The devoured animal in the predation relationship. (..................)
4. ★ The process of formation of a solution. (..................)
5. The natural area including living organisms and nonliving things. (..................)
6. ★ A space around the magnet in which the magnetic force appears. (..................)

B. What happens when...?

1. ★ You look at a red apple through a green glass sheet.
2. ★ You place your hand between a light source and the wall.

3 A. Choose the correct answer:

1. ★ Mixing red and green lights produces (yellow - cyan - magenta) light.
2. The solute in the mixture of chocolate and milk is (water - milk - chocolate).
3. ★ The speed of light in air is (faster than - slower than - equal to) that in water.
4. ★ When the compass is put beside a wire carrying electric current, (no deflection occurs - the needle deflects - no correct answer) .

B. Choose from column (B) what suits in column (A):

(A)	(B)
1. Dinosaurs	a. decompose food remains.
2. Fungi	b. get shelter and food from sponge.
3. Tapeworms.	c. are an example of extinct animals.
4. Tiny aquatic living organisms	d. share its digested food with the host.

1. .... 2. .... 3. .... 4. ....

4 **A. Give a reason for each of the following:**

1. ★ Wood is an opaque material.
2. ★ The compass is an important tool for travellers.

B. Correct the underlined words in the following statements:

1. Some types of mosquitoes infect man with smallpox disease. (................)
2. Solubility speed decreases by raising the temperature. (................)
3. ★ The unlike magnetic poles repel each other. (................)
4. Nodular bacteria fix oxygen in an inorganic form. (................)
5. ★ White objects absorb all the lights that fall on them. (................)

10 Dakahlia - Dakahila Educational Directorate

1 **A. Choose the correct answer:**

1. The solute in the mixture of chocolate and milk is ....
   a. milk b. water c. chocolate
2. ★ The dynamo generates .... energy from mechanical energy.
   a. electrical b. light c. thermal
3. .... ejects a black color fluid in the surrounding water when attacked by its enemies.
   a. Frog b. Sepia c. Butterfly
4. ★ Strawberry fruit seems to be in red color because it reflects only the .... color.
   a. green b. red and green c. red

B. Give a reason for each of the following.

1. ★ Rainbow can be seen after heavy rain-falling.
2. Green plants can make their own food.
3. The parasite doesn't kill its host.
4. Solution is a type of mixture.

2 **A. Put (✓) or (X) and correct the wrong ones:**

1. ★ The picture formed in the plan mirror is inverted. ( )
2. ★ Object's shadow is formed because light travels in curved lines. ( )
3. ★ Transparent objects have the same color of the light that doesn't travel through them. ( )
4. Vegetables salad is considered a homogenous mixture. ( )
5. Mixing red, green and blue colors produces white color. ( )

B. Write the scientific term for each of the following:

1. A food relationship between two organisms, one benefits while the other neither benefits nor gets harmed. (................)

2. ★ The colors we get by mixing two colors of the primary light colors. (..................)
3. ★ The tool that is used for locating the main four geographic directions. (..................)
4. Dissolving carbon dioxide gas in a sugary solution. (..................)

3 **A. Complete the following sentences:**

1. Increasing .... reduces solubility time.
2. ★ The prism separates sunlight into ....
3. ★ Red light + green light + blue light = ...
4. Fungi are considered .... living organisms.

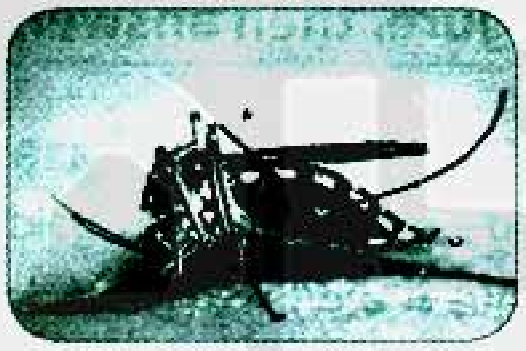
B. Answer the following questions:

1. ★ How can electricity make our life different? Write a paragraph.
2. How the following mixture can be separated:
   a. paper clips and flour
   b. chalk and water solution
   c. sugar solution

4 **A. What is meant by...?** 1. Ecosystem. 2. Environmental balance.

B. Show the type of food relationship illustrated in the following:


....


....


....

11 Behera - Kafr El-Dawar E. Zone - El Safwa Private School

1 **Complete the following sentences:**

1. ★ Opaque objects .... light, while transparent objects .... light.
2. .... is one of the internal parasites, while .... is one of the external parasites.
3. .... and .... are among the methods of forming mixture.
4. Predation process causes .... number of prey populations.
5. .... is a pure substance.

2 **A. Choose the correct answer:**

1. ★ In dynamo kinetic energy changes to (electric - light - magnetic - sound) energy.
2. ★ All the following are transparent materials except (carton - glass - water - air).
3. ★ By mixing all spectrum colors (magenta - black - white - blue) color is formed.
4. ★ Spoon seems broken in a cup containing water due to (light reflection - light splitting - light refraction - the fact that light travels in a straight line).

B. ★ Compare between the following:

	Magnetic material	Nonmagnetic material
Definition	....	....
Example	....	....

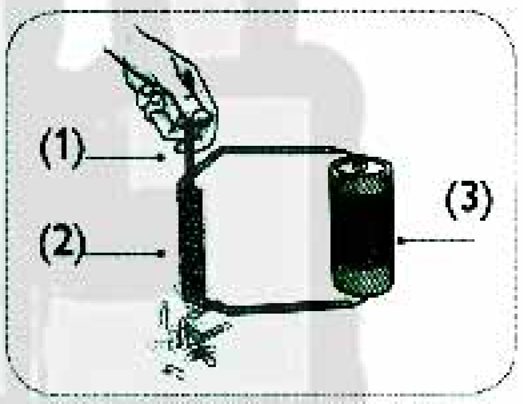
3 A. Write the scientific term for each of the following:

1. ★ Returning of light rays when they fall on a plane mirror. (....................)
2. ★ Space surrounding magnet and magnetic force appears on it. (....................)
3. The substances that dissolve in a solvent. (....................)
4. The natural area including living organisms and nonliving things. (....................)

B. Give a reason for each of the following:

1. ★ Red apple appears black through blue glass.
2. Some living organisms can make mimicry or camouflage.

4 A. ★ Look at the opposite figure, then answer:



- The figure represents .... :
  - (1) points to ....
  - (2) points to ....
  - (3) points to ....

- **What happens if: you approximate some iron filings to the figure?**

B. Write the name of tools used in:

1. ★ Knowing the four directions. (....................)
2. Separating a mixture of oil and water. (....................)

12 Suez - Directorate of Education

1 A. Complete the following sentences:

1. ★ The material which cannot allow light to transmit through is called ....
2. ★ The set that changes the mechanical energy into electric energy is known as ....
3. ★ Red light + green light + blue light = ...
4. ★ The magnet pole that always refers to north direction is called ....
5. Increasing temperature .... solubility time.
6. .... is one of the extinct organisms due to the changing in the natural conditions.

B. Mention the name of the tool that can be used in each of the following cases:

1. Separating a mixture of oil and water. (....................)
2. Separating light into seven colors. (....................)

2 A. Write the scientific term for each of the following:

1. The organisms which help to get rid of dead organisms. (....................)
2. ★ The colors we get by mixing two colors of the primary light. (....................)
3. ★ A tool that is used for locating the main four geographic directions. (....................)
4. A process that needs the presence of solvent and solute. (....................)
5. The food relationship between two organisms that get benefit from each other. (....................)
6. The natural area including living organisms and non-living things. (....................)

*** B. Compare between the following:**

	Magnetic material	Nonmagnetic material
Definition	....	....
Example	....	....

3 A. Choose the correct answer:

1. ★ The dynamo is fixed in the bicycle (seat - pedal - tire).
2. ★ The picture formed through a narrow hole is (upright minimized - inverted minimized - inverted magnified).
3. ★ Which of the following is considered a secondary color? (Yellow - Green - Blue).
4. ★ We can see things as a result of (reflection - refraction - absorption) of rays.
5. The animal that devours another animal is called (parasite - host - predator).
6. An example of decomposers is (fungus - rabbit - plant).

B. What happens in each of the following...?

1. ★ When a magnet is hanged freely to move.
2. Cutting the trees down.

4 A. Put (✓) or (✗):

1. ★ Filtration is used to separate soluble solid materials. ( )
2. Some living organisms can change their color to simulate the colors of the environment where they live to hide from their enemies. ( )
3. The balance of ecosystem occurs due to interference of man. ( )

B. Give a reason:

1. ★ The moon cannot be considered a source of light.
2. Air is a mixture.

C. Choose from column (B) what suits in column (A):

(A)	(B)
1. Ascaris worm	a. can be separated by using a magnet
2. Pure water	b. is (are) internally parasitism
3. Iron filings and sand mixture	c. cause (s) anemia
4. A food relationship between man and liver worm	d. is (are) a pure substance
	e. is (are) external parasitism

1. .... 2. .... 3. .... 4. ....

13 Luxor - El Salam Language School

1 Choose the correct answer:

1. ★ The coil of the dynamo is made up of (copper - iron - carbon).
2. (Distilled water - Milk - Mineral water) is an example of pure substance.
3. The substance that dissolves in solvent is (alcohol - water - salt).
4. ★ The (red - blue - yellow) is from secondary lights.
5. ★ The light travels in (curved - straight - broken) lines.
6. ★ The (gold - steel - copper) is a magnetic material.
7. Jawless lamprey and fish relationship is (predation - saprophytism - parasitism).
8. Mosquitoes cause (anemia - malaria - smallpox disease).

2 A. Write the scientific term:

1. ★ The material that doesn't allow light to pass through. (....................)
2. Living organisms fed by decomposing organic wastes or dead bodies. (....................)
3. ★ Reflection of light in one direction. (....................)
4. The balance among the components of the ecosystem. (....................)
5. ★ The space around the magnet where the magnetic force appears. (....................)

B. Give a reason for each of the following:

1. ★ Formation of image through narrow holes.
2. Water is a common solvent.
3. Relation between nodular bacteria and bean plants is mutualism.

3 A. Complete the following statements:

1. Solid materials can be mixed by .... and ....
2. Relation between dionaea and insects is .... relationship.
3. ★ Electromagnet changes .... energy into .... energy.
4. .... is an example of a gas-liquid mixture.

5. ★ .... + ... = cyan
6. .... and .... keep the environmental balance.

B. Mention one function (importance) of:

1. ★ Compass. 2. ★ Glass prism. 3. Separating funnel.

4 A. How can you separate these mixtures?

1. Salty solution.
2. Iron filings and sand.
3. ★ Mud and water.

B. Correct the underlined words:

1. Cutting the trees that cause environmental balance. (....................)
2. Flaria worm causes anemia. (....................)
3. ★ The light gets reflected when it passes through water and air. (....................)

C. Mention an example of:

1. Homogeneous mixture.
2. Camouflage phenomenon.

14 Aswan - Aswan Educational Directorate

1 A. Choose the correct answer:

1. The material that dissolves to produce solution is called ....
   a. solvent b. solute c. mixture
2. .... takes place by some living organisms to hide from their enemies.
   a. Camouflage b. Commensalism c. Parasitism
3. When you mix two or more kinds of matter together, the produced matter is called ....
   a. element b. compound c. mixture
4. ★ Light cannot pass through .... materials.
   a. transparent b. semi-transparent c. opaque
5. ★ The picture formed through a narrow hole is ....
   a. upright minimized b. inverted minimized c. inverted magnified

B. Mention one function for each of the following:

1. ★ Compass. 2. ★ Dynamo.

2 A. Put (✓) in front of the right statement and (✗) in front of the wrong ones:

1. The oil and water can be separated by filtration. (   )
2. The relation between flaria worm and man is a parasitism relation. (   )
3. ★ The electromagnet loses its power when the electric current is cut. (   )

4. ★ When the white light strikes a red rose, it reflects the white color. (   )
5. Ecosystem is composed of nonliving things like water and living orgarnisms like plants. (   )

B. ★ Give a reason for each of the following:

1. Air is considered a mixture.
2. The moon cannot be considered a source of light.

3 A. Write the scientific term for the following:

1. The food relationship between the living organisms which devour other organisms. (..............)
2. ★ The darkened area formed as a result of light falling on an opaque object. (..............)
3. ★ The space around the magnet in which the effect of magnetic force appears. (..............)
4. ★ The light results from mixing red, blue and green colors. (..............)
5. ★ Materials through which objects can be seen clearly. (..............)

B. What would happen in the following cases ... ?

1. Bacteria completely disappear.
2. ★ Passing of electric current in a wire wrapped around a rod of soft iron?

4 A. Choose from column (B) what suits in column (A):

(A)	(B)
1. ★ Refraction.	a. separate(s) the solid substances that dissolve in solution.
2. ★ Yellow light.	b. don't/doesn't mix.
3. Evaporation.	c. is(are) autotrophic.
4. Water and oil.	d. occur(s) when light transmits through two transparent media.
5. Green plants.	e. result(s) from mixing red and green lights.

1. .... 2. .... 3. .... 4. .... 5. ....

B. Mention one difference between:

1. ★ Magnetic and nonmagnetic substances.
2. ★ Regular and irregular reflecton.

50 سنة أضواء ١٩٦٨-٢٠١٨

5th Prim.
FIRST TERM

SCIENCE

Model Answers



ALADWAA

First: The Main Book

Unit 1 Energy

Lesson 1 Light

P. 14

Benchmark

1 1. inverted - minimized
2. translucent - opaque

2 straight.

3 1. transparent materials
2. shadow 3.visible spectrum

4 1. inverted 2. straight

5 Due to light traveling in straight lines.

6 true.

Exercises on Lesson 1

P. 21

1 1. a) 2. c)
3. c) 4. a)
5. b) 6. c)
7. a) 8. b)
9. d) 10. a)
11. a) 12. c)
13. c) 14. b)
15. a) 16. b)
17. b) 18. c)
19. a) 20. b)
21. c)

2 1. visible spectrum.
2. heat energy, electric energy, potential energy.
3. sunlight. 4. straight.
5. straight lines. 6. straight lines.
7. photographic camera.
8. shadow. 9. smaller.
10. transparent material.
11. transparent material.
12. transparent and semi-transparent (translucent).
13. semi-transparent opaque.
14. translucent, opaque.
15. light reflection.
16. reflecting (opaque).
17. regular reflection and irregular reflection.
18. regular reflection, irregular reflection
19. scattered.
20. inverted, minimized. 21. light reflection.
22. reflect, refract.
23. light refraction. 24. refraction.
25. refracts. 26. 7, spectrum color.
27. rainbow.
28. seven spectrum colors. 29. rainbow.

3 1. (✗) The visible spectrum is the light energy which can be seen.
2. (✓)
3. (✗) The moonlight is the reflection of the sunlight that falls on its surface.
4. (✗) Object shadow is formed because light travels in straight lines.
5. (✓) 6. (✓)
7. (✗) inverted.
8. (✗) The picture which is formed in the mirror is upright.
9. (✗) sun .
10. (✓) 11. (✗) opaque
12. (✓) 13. (✗) reflection
14. (✓)
15. (✗) in different directions.
16. (✗) light refraction. 17. (✗) splitting
18. (✗) white 19. (✓)
20. (✓)

4 1. visible spectrum
2. sun 3. shadow
4. transparent materials
5. opaque materials 6. opaque materials
7. opaque materials 8. semi-transparent.
9. opaque. 10. light reflection
11. regular reflection
12. irregular reflection 13. light refraction
14. rainbow
15. triangular glass prism
16. spectrum colors

5 1. (1-d), (2-c), (3 -e), (4-b)
2. (1-d), (2-f), (3-c), (4-a), (5-b)

6 1. Because it reflects the sunlight that falls on its surface.
2. Because light travels in straight lines.
3. Because light travels in straight lines.
4. Because objects can be seen clearly (in full details) behind and allow most light to pass through.
5. Because objects can be less seen clearly behind than the transparent one and it allows only some light to pass through while carton doesn't allow light to pass through it.
6. Because the transparent materials allow most light to travel through.
7. Because the plane mirror reflects the light which falls on it and this light reaches my eyes causing the vision. (Due to regular reflection).

8. Because this phenomenon results from refraction of the reflected light coming from the immersed part of the under water surface. (Due to light refraction).
9. Because the sunlight is an 7 excellent example of white light, as it is made up of seven spectrum colors.
10. Because the sunlight separates into 7 spectrum colors when it passes through water droplets during rainfall.

7
1. You can see the image clearly.
2. The formed image is minimized and inverted.
3. Sunlight splitting into 7 colors and rainbow appears.
4. You cannot see the picture.
5. You can see your image due to the regular reflection of light.
6. The spoon appears broken at the water surface due to the light refraction.
7. The white light separates into seven spectrum colors.

8
1. It is the light energy which can be seen.
2. It is the darkened area which is formed as a result of light falling on an opaque object.
3. They are the materials that allow most of light to travel through and things can be seen clearly (in full details) behind.
4. They are the materials that allow some light to travel through and things can be seen less clearly behind than the transparent ones.
5. They are the materials that do not allow the light to travel through and things cannot be seen behind.
6. It is the bouncing of light rays when it falls on a surface.
7. It is the change in the direction of light rays when they pass through the separating surface between two different transparent media.
8. It is the splitting of the visible white light into seven spectrum colors.

9

1.

P.O.C	Transparent material	Translucent material	Opaque material
Definition	It is the material which allows most of light to pass through and objects can be seen clearly (in full details) through.	It is the material which allows some light to pass through and objects can be seen less clearly than transparent one.	It is the material that does not allow light to pass through and objects cannot be seen through.
Examples	clear water	frosted glass	rocks

2.

P.O.C	Regular reflection	Irregular reflection
Definition	It is the reflection of light on a smooth and shiny reflecting surface, where light rays are reflected directly in one direction.	It is the reflection of light on a rough reflecting surface, where light rays are reflected and scattered in different directions.

3.

P.O.C	Smooth surface	Rough surface
Definition	When light rays fall on a smooth surface light rays are reflected in one direction.	When light rays fall on rough surface light rays are reflected in different directions.

4.

P.O.C	Light reflection	Light refraction
Definition	It is the bouncing (going back) of light rays when light falls on a surface).	It is the change in the direction of light rays when light passes through a separating surface between two transparent media, due to the change in the light speed.

10 1. regular. 2. irregular.

11
1. light reflection
2. It is the bouncing of light rays when it falls on a surface.
3. regular reflection - irregular reflection

12
1. separation – seven spectrum colors.
2. Once these seven colors accumulate with each other, you can see the white light.
3. The visible white light is made up of seven spectrum colors.

13
1. Shadow is the darkened area which is formed as a result of light falling on an opaque object. The formation of shadow is an evidence that light travels in straight lines.
2. We can see the rainbow when sunlight passes through:
   - water droplets during rainfall.

   or

   - the suspended droplets in air.

3. The materials can be divided into 3 types according to transmission of light through it.

Transparent materials	Translucent materials	Opaque materials
They are the materials that allow most of light to travel through and things can be seen clearly (in full details) behind.	They are the materials that allow some light to travel through and things can be seen less clearly behind than the transparent ones.	They are the materials that do not allow the light to travel through and things cannot be seen behind.
Examples		
• Glass windows. • Air. • Clear water.	• Tissue paper. • Screen doors. • Frosted glass.	• Carton paper. • Wood. • Clay forms.

14 Activity on page 8 in the Main Book.

15 prism.

16 Answer by yourself.

17 1. light refraction 2. faster.

TIMSS Like questions on Lesson 1

P. 30

1 a. Electric lamps - candle - torch - sun.
b. sun - candle
c. non-luminous object.
d. When sun rays fall on my body it reflects the sun rays which reaches his eyes causing the vision.

2 a. 2 m b. 1.5

3 a.

Material	Some light passes through	No light passes through
Mirror		✓
Clear plastic cardboard	✓	
Foil		✓

b. I. Television. II. is a light source.

Lesson 2 Seeing colored objects

P. 38

Benchmark

1 1. white light 2. white light
3. green

2 1. primary colored lights.
2. secondary colored lights.

3 1. Because it absorbs all light colors except its own color (green) which it transmits.
2. Because it reflects yellow color.

4 1. It absorbs all light colors
2. Cyan color is formed.
3. It appears by black color.

Exercises on Lesson 2

P. 40

1 1. a) white 2. d) reflects 3. b) transmits
4. c) absorbs 5. b) black 6. b) yellow
7. a) yellow 8. d) white 9. a) green
10. c) magenta 11. a) green

2 1. seven - spectrum colors
2. seven spectrum colors.
3. white light. 4. green.
5. transmitted light. 6. opaque.
7. reflected. 8. red.
9. yellow. 10. absorbs - reflect.
11. all light colors - green one.
12. red. 13. primary.
14. white light.
15. yellow, cyan and magenta.
16. cyan. 17. red and blue.
18. red, green 19. white light.

3 1. (✗) When the white light strikes a red rose, it reflects the red color.
2. (✓) 3. (✓) 4. (✓)
5. (✗) The green table reflects green color only.
6. (✓)
7. (✗) Red, green and blue are primary light colors.
8. (✓) 9. (✓) 10. (✗) blue + green
11. (✗) We get any secondary light color by mixing two primary light colors.
12. (✗) red

4 1. white light 2. spectrum colors
3. colored transparent object
4. colored opaque objects
5. white opaque object

6. black opaque object
7. primary light colors
8. primary light colors
9. cyan light color
10. magenta light color
11. white light color
12. secondary light colors
13. secondary light colors

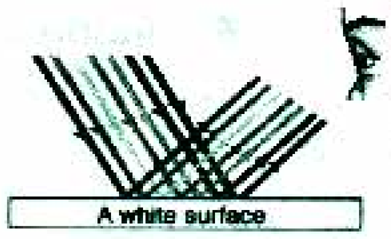
5 (1-b), (2-e), (3 - c), (4-a), (5-d)

6
1. Because transparent and semi-transparent bodies absorb all the light colors and allow their own colors only to pass through.
2. Because it absorbs all light colors and transmits the green light only.
3. Because it absorbs all light colors and reflects the red color only.
4. Because it reflects all light colors while a blackboard absorbs all light colors.
5. Because black clothes absorb all light colors and keep the body warm.
6. Because it reflects all light colors.
7. Because the green transparent glass does not transmit the reflected red color through.
8. Because yellow glass transmits the reflected yellow color through it.
9. Because it is produced by mixing two primary light colors (red & green).
10. Because it is not produced by mixing any light colors.

7
1. The white light separates into seven spectrum colors.
2. Mixing the spectrum colors produces the visible white light.
3. The black object absorbs all the spectrum colors and appears black.
4. The black surface absorbs the red light and appears black.
5. The green window absorbs all the spectrum colors which fall on it and allows the green light only to transmit through.
6. The blue bottle absorbs all the spectrum colors which fall on it and allows the blue light only to transmit through.
7. The apple appears black.
8. Mixing the primary light colors gives the white light color.
9. Mixing the red and blue lights gives magenta light color.
10. Mixing the red and green lights gives the yellow light color.
11. The white ball reflects the green light and appears green.

8
1. The light colors that are impossible to be produced by mixing two of the other colored lights.
   Primary light colors are red, green and blue lights colors.
2. The light colors produced by mixing two primary light colors.
   Secondary light colors are yellow, cyan and magenta colors.

9 A.

White opaque objects	Black opaque objects
When the white light strikes the white opaque objects as shown, these objects reflect all the spectrum colors.	When the white light strikes the black opaque objects as shown, these objects absorb all the spectrum colors and do not reflect any color.
	
⇒ So, the white opaque objects appear to be white (the same color of light that falls on it).	⇒ So, the black opaque objects appear to be black.

B.

Primary light colors	Secondary light colors
They are the light colors which is impossible to be produced by mixing two of the other colored lights.	They are the light colors which is produced by mixing two primary light colors.
Ex: • Red • Green • Blue	Ex: • Yellow • Cyan • Magenta (Purple)

10
1. The colored disk appears white.
2. Mixing the spectrum colors produces the visible white light.

11
1. red - blue.
2. The colored opaque objects have the same colors of the light which they reflect.

12
1. black.
2. The apple appears to be red behind the transparent glass sheet.
3. spectrum colors.

TIMSS Like questions on Lesson 2

P. 45

1 a. red + green b. green + blue
c. blue + red

2 Green light is reflected.

3 Because green filter absorbs all light colors except the green one.

Lesson 3 Magnetism

P. 52

Benchmark

1
1. repel - attract
2. magnetic materials - non-magnetic materials.
3. black.
4. magnesia

2
1. poles of magnet.
2. magnet.

3
1. It takes fixed directions (north - south).
2. They will repel.

4
1. Because wood doesn't get attracted to magnet.
2. Because iron is attracted to magnet.

5
1. north
2. 2000

Exercises on Lesson 3

P. 56

1
1. a. 2000
2. b. natural magnet
3. d. magnetic materials
4. c. wood
5. d. cobalt
6. a. north
7. c. unlike magnetic poles repel each other.
8. (a)
9. a. its two poles
10. d. its middle
11. b. the north pole is colored red, but the south pole is colored blue.
12. c. north-south
13. b. two
14. c. magnetic force
15. c. small light magnetic needle
16. b. its two poles
17. b. attract
18. a. repel

2
1. Magnesia - iron
2. natural magnet - artificial magnet
3. iron - magnetite.
4. shapes - sizes.
5. magnetic - non-magnetic materials.
6. iron, steel
7. north pole.
8. two poles.
9. two - north - south.
10. fixed - (north-south).
11. repel - attract
12. attracts - repels.
13. two poles.
14. magnetic field.
15. magnetic - magnetic field.
16. compass.
17. William Gilbert.
18. compass.
19. the four main geographical directions.
20. north - south.

3
1. (✗) 2000 years ago, the ancient Greeks found Magnesia.
2. (✗) Natural magnet is a black rock.
3. (✓)
4. (✗) A magnet attracts all magnetic materials.
5. (✓)
6. (✗) Magnetic materials are attracted to the magnet.
7. (✗) Aluminum is not attracted to the magnet.
8. (✗) The magnet does not attract copper wires, but it attracts metallic paper clips.
9. (✗) The magnet has two poles.
10. (✗) The freely suspended magnet always takes a fixed direction which is "North-South".
11. (✓)
12. (✓)
13. (✓).
14. (✗) The like poles repel each other, whereas the unlike poles attract each other.
15. (✗) The greatest magnetic force of the magnet is concentrated at its poles.
16. (✗) invisible.
17. (✓)

4
1. Natural magnet "Black rock".
2. Magnetic materials.
3. Non-magnetic materials.
4. The two poles of the magnet.
5. The middle of the magnet.
6. The north pole.
7. The magnetic field.
8. The south pole.
9. Compass.
10. Compass.
11. The magnetic force.

5
1. Magnetite is a natural magnet.
2. Natural magnet is one of the iron ores known as magnetite.
3. The material attracted to the magnet is a magnetic material.
4. Iron gets attracted to the magnet.
5. Magnetic force is concentrated at the two poles of the magnet.
6. The highest magnetic force is concentrated at two poles.
7. compass.

6 (1-c), (2-e), (3 - d), (4-b), (5-a)

7
1. Because these materials are attracted to the magnet.
2. Because aluminum, copper and glass are not attracted to the magnet.
3. Because iron is a magnetic material, while copper is a non-magnetic material.
4. Because copper is not attracted to the magnet.
5. As they are magnetic materials.

6. Because wood isn't attracted to magnet.
7. Because the two poles of the magnet have the most powerful force of attraction.
8. Because metallic paper clips are magnetic materials, while copper wires are non-magnetic materials.
9. Because unlike magnetic poles attract each other, while like magnetic poles repel each other.
10. It identifies the four main geographical directions.

8
1. • Cobalt and steel are attracted to the horseshoe magnet.
   • Wood and copper are not attracted to the horseshoe magnet.
2. • Metallic paper clips are attracted to the horseshoe magnet.
   • Copper wires are not attracted to the horseshoe magnet.
3. • It takes a fixed direction (North-South) direction.
4. The north pole of the magnetic needle is directed towards the north direction of the Earth, while its south pole is directed towards the south direction of the Earth.
5. The north pole attracts the south pole.
6. The two north poles repel each other.
7. • Iron filings are arranged around the magnet in a regular shape which is called magnetic field.
   • The two poles of the magnet are the most areas in which the iron filings are assembled.

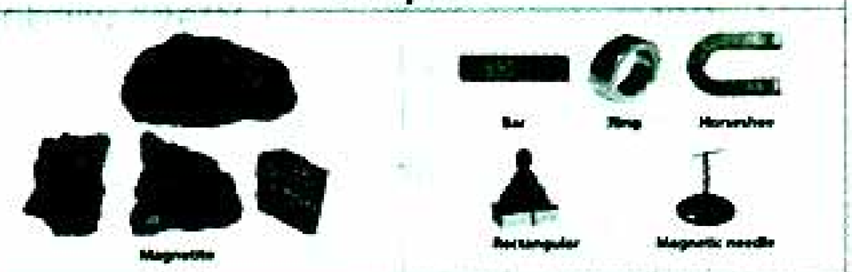
9
1. One of the iron ores which is known as magnetite.
2. The materials that are attracted to the magnet.
3. The materials that are not attracted to the magnet.
4. The regions of the magnet where the magnetic force is the most powerful.
5. It is a region or a space around a magnet where the effect of the magnetic force appears.
6. It is the force by which the magnet attracts some magnetic materials.

10
1.

Magnetic materials		Non-magnetic materials
• They are the materials which are attracted to the magnet.		• They are the materials which are not attracted to the magnet.
Examples		
• Iron • Cobalt	• Steel • Nickel	• Paper • Glass - Wood • Plastic - Chalk • Aluminum • Copper

2.

Natural magnet "Black rock"	Artificial magnet
• It is one of the iron ores which is known as magnetite.	• It is a man-made magnet. • It has different shapes and sizes.
Shapes	



11
• The magnet has two poles.
• The freely suspended magnet always takes a fixed direction (North-South).
• The like magnetic poles repel each other; while unlike magnetic poles attract each other.
• The magnet is surrounded by an area called "magnetic field".

12
1. • One pole of the magnet is directed towards the north direction of the Earth, while the other pole is directed towards the south direction of the Earth.
   • The pole of the magnet which points to the north direction is called "north pole (N)", while the pole of the magnet which points to the south direction is called "south pole (S)".
   • Therefore, the freely suspended magnet always takes a fixed (North-South) direction.
2. • The two north poles of two magnets repel each other.
   • Therefore, the like magnetic poles repel each other.

13
1. a. North Pole b. Middle of magnet
   c. South Pole
2. B

14
1. a. The south pole attracts the north.
   b. The two south poles repel each other.
   c. repel
2. repel - attract

15
1. compass.
2. identify the four main geographic directions.
3. a small magnetic needle.

16 compass.

TIMSS Like questions on Lesson 3

P. 63

1

Magnetic	Non-magnetic
• Steel Kettle. • Cast iron cooking pot. • Stainless steel knives. • Stainless draining board. • Stainless forks.	• Aluminum foil • Copper wire • Brass window catch

2 a. Yes, unlike poles attract each other.
b. Objects C and D are similar, because like poles repel each other.

Lesson 4 Magnetism and electricity

P. 68

Benchmark

1 1. battery - copper coil - wrought iron
2. electric - magnetic.

2 Due to the increase in the intensity of electric current so the magnetism increases.

3 It's used in electric bell - mixer - TV.

4 1. (✓) 2. (✗)

5 The iron bar changes into magnet temporarily.

Exercises on Lesson 4

P. 74

1

1. b	2. a	3. b	4. d
5. b	6. c	7. b	8. d
9. a	10. d	11. b	12. c
13. d	14. d		

2 1. magnetic effect, electric
2. electromagnet
3. electromagnet (temperoray magnet)
4. copper wire, bar of wrought iron, dry battery
5. electric current, magnet
6. cutting electric current
7. electric, magnetic
8. number of coil turns, number of batteries.
9. cranes
10. electric current
11. dynamo
12. Faraday
13. kinetic, electric
14. kinetic, electricity
15. the turns of coil, using a strong magnet
16. dynamo
17. small dynamo, huge dynamo
18. huge dynamo

3 1. (✗) and battery 2. (✓) 3. (✓)
4. (✓)
5. (✗) passes through a coil of wire twisted around a wrought iron bar
6. (✗) changing kinetic energy into electric energy
7. (✓) 8. (✓) 9. (✓)
10. (✗) copper 11. (✗) electromagnet
12. (✓) 13. (✓)

4 1. electromagnet 2. electromagnet
3. dynamo 4. dynamo
5. cranes 6. huge dynamo
7. small dynamo
8. ammeter 9. wrought iron

5 1. d 2. a 3. b 4. e 5. c

6 1. Because it loses its magnetism when cutting the electric current.
2. Because the electric current intensity increases by increasing the number of batteries, so the magnetic force increases.
3. Due to the producing of electric current.
4. Because it is used to make the big-sized winches (cranes) that is used to lift the heavy iron blocks in factories.
5. Because it is used to make cranes, disc drive, electric bell, electric mixer and TV sets.
6. Because it consists of a coil that moves between two poles of the magnet (The magnet has an electric effect).
7. Because the electric current intensity increases by increasing the motion of the coil between the two poles of the magnet.

7 1. The wrought iron changes into temporary magnet.
(2. and 3.) The electric energy is generated.

8 1. The magnet which is made by electricity.
2. The set that is used to change the mechanical energy into electric energy.
3. A dynamo contains a huge magnet.

9 Answer by yourself.

10

P.O.C.	Electromagnet	Dynamo
Scientific idea	• The electric current has a magnetic field.	• By moving the coil in the magnetic field, the electric current is generated in the coil.
Structure	1. - Copper wire coiling around - bar of wrought iron 2. Dry battery	1. Copper coil 2. A magnet

11 1. Changing electric energy into magnetic energy which is used in TV, disc drive.
2. It is used to light cities and operating factories.
3. It is used to lift the heavy iron blocks in factories.
4. It is used to generate electricity.

12 1. magnet, copper coil 2. electric current
3. kinetic, electric 4. dynamo

13

	A	B
1. The name of device	Electromagnet	Dynamo
2.. The idea of work.	electric energy changes into magnetic energy	mechanical energy changes into electric energy
3. Uses	T.V, disc drive	lights the bulb of bicycle. lighting cities

TIMSS Like questions on Lesson 4

P. 79

1 1. True 2. False 3. False
4. False 5. True

2 - big-sized winch - disc drive
- television - electric bell
- electric mixer

3 a. ammeter b. dynamo
c. electromagnet d. wrought iron
e. temporary f. increasing

Unit 2 Mixtures

Lesson 1 Mixtures

P. 88

Benchmark

1 1. calcium - magnesium 2. sugar
3. grinding, stirring

2 1. Because it consists of two or more different types of particles.
2. Because both of them consist of only one type of particles.

3 soda water

4 1. homogeneous 2. filtration

5 1. homogeneous 2. pure substance
3. mixture

Exercises on Lesson 1

P. 93

1 1. a 2. b 3. d 4. c 5. c
6. a 7. a 8. b 9. b 10. d
11. b 12. c 13. b 14. d 15. c
16. d 17. a

2 1. pure substance – mixtures
2. pure substance – mixtures
3. pure substance 4. mixtures
5. sugar – concrete
6. solid-solid – liquid-liquid – gaseous-gaseous.
7. two , solid , vegetable salad
8. two, liquid , oil , water
9. stirring - grinding 10. gases , air
11. gas, liquid , soda water
12. oxygen, nitrogen , water vapor
13. carbon dioxide, sugary solution
14. properties 15. mixed, ratio
16. homogeneous, heterogeneous
17. filtration
18. magnetic attraction
19. shaking, grinding
20. shaking , stirring
21. shaking, grinding
22. shaking, stirring 23. solid, magnetic
24. separating funnel 25. solid, soluble

3 1. (✗) orange Juice 2. (✓)
3. (✓) 4. (✗) liquid and liquid
5. (✗) heterogeneous
6. (✗) liquid and liquid
7. (✓) 8. (✗) solid-liquid
9 . (✓) 10. (✗) mixture of gases
11. (✓) 12. (✓)
13. (✗) separating funnel.
14. (✓)
15. (✓) 16. (✗) separating funnel
17. (✗) shaking or stirring
18. (✗) insloube solid
19. (✓) 20. (✗) filtration

4 1. pure substances
2. mixtures 3. mixtures
4. (gaseous-liquid) mixture (soda water)
5. solution
6. sugary solution is formed
7. atmospheric air 8. mineral water
9. evaporation 10. evaporation
11. magnetic attraction 12. salt pans

5 1. pure substances 2. sugar
3. fruit salad 4. oil/water
5. stirring
6. sugary solution (sugar and water)
7. filtration 8. evaporation
9. filtration 10. oil

6 1. (1- b), (2- a), (3- d), (4- e)
2. (1- b), (2- a), (3- e), (4- d)

7 1. Because it is made up of only one type of identical particles.
2. Because distilled water consists of only one type of particles while mineral water consists of two or more different types of particles.
3. Because it consists of more than one type of particles.
4. Because it is made of more than one type of particles (oxygen - carbon dioxide - nitrogen).
5. Because sand does not dissolve in water.
6. Because it consists of two or more solids.
7. Because it consists of two liquid substances.
8. Because it consists of carbon dioxide dissolved in a sugary solution.
9. Because iron is a magnetic substance that gets attracted to magnet.
10. Because the separating funnel is used to separate the heterogeneous mixture (oil-water).

8 1. Homogeneous salty solution is formed.
2. Homogeneous sugary solution is formed.
3. Water is evaporated and solid salt is deposited.
4. Homogeneous soda water solution is formed.
5. Water is evaporated and solid salt is deposited.
6. Heterogeneous solution is formed.
7. Steel paper clips will be attracted to the magnet but sand will not.

9 1. concrete 2. apple juice
3. stirring 4. evaporation

10 1. Separation of a mixture of sand and water.
2. Separation of a mixture of oil and water.
3. Formation of solution.
4. Separation of an insoluble solid substance from water.
5. Separation of table salt from water.
6. Formation of solid-solid mixture.

11 1. By evaporation water disappears and salt is deposited.
2. By filtration. 3. By magnetic attraction.
4. By filtration. 5. By separating funnel.
6. a. By magnetic attraction to separate iron filings,
b. adding water
c. filtration to separate sand
d. evaporation to separate salt.
7. By filtration. 8. by evaporation

12 1. It is the substance that is made up of only one type of identical particles.
2. It is the substance that consists of more than one type of particles.
3. A mixture that consists of two or more different solid materials.
4. A mixture that consists of two or more different liquids.
5. A gaseous-gaseous mixture, as it is a mixture of gases such as (nitrogen - oxygen - carbon dioxide and water vapor).
6. A mixture that consists of solid and liquid substances.
7. A mixture that consists of two or more different gases.
8. A mixture that consists of a gas and a liquid.
9. A liquid-gaseous mixture, as it is a mixture of water (liquid) and carbon dioxide (gas).

13 1. Separating funnel.
2. Because there are many liquids (such as oil) that do not mix with water.
3. Oil-water mixture. [heterogeneous liquid mixture]

14 1. Solid-solid mixture.
2. No, the mixture keeps its own properties.

15 A. Filtration. as (sand water)
B. Evaporation. as (salty water)
C. Separating funnel as (oil - water)
D. Magnetic attraction as (iron - sand)

16 1. Filtration is used in the separation of insoluble solid substances from mixture with water.
Example: the separation of a mixture of sand and water.
2. Evaporation is used in the separation of some types of solution.
Example: the separation of mixture of salty water.

17

Pure substance	Mixture
• It's the substance that consists of only one type of identical particles such as sugar.	• It's the substance that consists of 2 or more types of different particles such as concrete.

TIMSS Like questions on Lesson 1

P. 101

1 a. true b. false c. false
d. false e. true

2 iron filings - sand - vinegar - oil - mercury - baking soda - table salt

3 Answer by yourself.

Lesson 2 Solutions

P. 108

Benchmark

1 1. homogeneous mixture
2. reduce
3. solute + solvent $\xrightarrow[\text{process}]{\text{solubility}}$ solution

2 1. (a) homogeneous.
2. (b) solution 3. (d) water.

3 1. increases.
2. increases
3. homogeneous

4 Because it has the ability to dissolve thousands of solutes.

5 1. (✗) 2. (✓)

Exercises on Lesson 2

P.110

1
1. a 2. a 3. b 4. c 5. a
6. c 7. a 8. d 9. b 10. d
11. d 12. b 13. c 14. c 15. d
16. b 17. a 18. b

2
1. mixture
2. homogeneous mixture solution
3. solvent/solute
4. water
5. water
6. solute
7. solute/solvent
8. salt/water
9. dissolve/solvent
10. solvent/solution
11. solute
12. heterogeneous/suspended
13. heterogeneous (suspension)/filtration
14. faster
15. decreases
16. solvent
17. decrease
18. stirring on solubility process
19. solute
20. temperature/amount of solute or solvent/ stirring/shaking

3
1. (✗) cannot
2. (✓)
3. (✗) homogenous
4. (✓)
5. (✗) apple, tea
6. (✓)
7. (✓)
8. (✓)
9. (✓)
10. (✓)
11. (✗) by filtration
12. (✗) amount of solvent
13. (✗) decreasing the quantity of solute
14. (✗) increases
15. (✓)

4
1. heterogeneous mixture
2. solvent
3. homogeneous mixture
4. solution
5. solvent
6. solute
7. solution
8. suspension
9. solubility
10. solubility
11. solvent
12. solution
13. water

5
1. can be separated
2. increases
3. increases
4. increases
5. heterogenous
6. solvent/solute
7. decreasing
8. homogeneous
9. decreases
10. increases
11. solvent
12. solvent
13. insoluble
14. increases

6
1. (1- e), (2- d), (3- a), (4- c), (5- b)
2. (1- c), (2- d), (3- a), (4- b)

7
1. Because solution consists of more than one type of particles.
2. Because mixtures are of two types: homogeneous and heterogeneous.
3. Because its components cannot be distinguished.
4. Because it is a mixture in which the components can be distinguished.
5. Because its components cannot be distinguished.
6. Because it has the ability to dissolve thousands of substances in it.
7. Because the kind of solute affects the solubility process.
8. Because by increasing the temperature, the particles move faster and dissolve faster.
9. Because by increasing the temperature, solubility process increases.
10. Because by the process of grinding or increasing the temperature, solubility process increases.
11. Because the particles of the solute are insoluble and suspended in the solution.
12. Because solubility process increases when the quantity of the solvent decrease.

8
1. Homogeneous salty solution is formed.
2. Solubility is faster in the beaker which contains a higher amount of water.
3. Solubility process increases by increasing the temperature.
4. Solubility process decreases by increasing the quantity of solute.
5. Solubility process increases by increasing the quantity of solvent.

9
1. A type of mixtures in which we cannot distinguish between the components.
2. A type of mixtures in which, we can distinguish between the components.
3. It is a homogeneous mixture in which the solute breaks down into its most basic particles that spread throughout the solvent.
4. It is the substance which dissolves in a solvent.
5. It is the substance in which solute disperses or dissolves.
6. It is the process by which a solute dissolves in a solvent leading to the disappearance of the solute.
7. It is a heterogeneous liquid mixture in which the particles of the solute are suspended throughout the solvent.

10
a. **Obs.** : The sugar dissolves faster by stirring.
Conc.: Solubility process increases by stirring.
b. **Obs.** : Sodium chloride dissolves in water faster than sodium carbonate.
Conc.: The kind of solute affects the solubility process.
c. **Obs.** : 5 g of sugar dissolves faster.
Conc.: Solubility process increases by decreasing the quantity of the solute.
d. **Obs.** : The sugar dissolves faster by heating.

Conc.: Solubility process increases by increasing the temperature.

e. **Obs** : The sugar dissolves faster with a greater amount of solvent.

Conc. : Solubility process increases by increasing the quantity of solvent.

11 1. Mixtures are of two types (homogeneous or heterogeneous).
Solution is homogeneous.
2. **Natural orange juice** is a suspension, while **apple juice** is a solution.
3. **Solute** is a substance which dissolves in the solvent.
Solvent is a substance in which the solute dissolves.
4. **Grinding:** To form a solid-solid mixture.
Shaking: To form a solid-solid mixture or solid-liquid mixture.

12 1. The sugar dissolves faster in hot water because the solubility process increases by increasing the temperature.
2. The sugar dissolves faster by stirring because the solubility process increases by stirring.
3. The sugar dissolves faster with the greater amount of the solvent because the solubility process increases by increasing the quantity of solvent.

13 By increasing the temperature the rate of breaking the solid substance into small parts increases, so the solubility process increases.

14 Activity on page 106 in the Main Book.

15 1. a. heterogeneous or solid-solid mixture
b. magnet
2. a. mixture
b. it is strong and easily shaped.
c. Answer by yourself.
3. a. separating funnel
b. in case of liquids which are not mixed with water
c. oil

16 1. temperature. 2. stirring
3. the quantity of solvent and solute.
4. a kind of solute.

TIMSS Like questions on Lesson 2

P. 119

1 salt - sugar - chocolate

2 • It dissolves faster in hot water.
1. hot water 2. very cold water
3. the solubility time increases.

3 1. a) Yes.
b) Because the colored substance disappeared and we cannot distinguish between its components.
2. solute - solvent
3. Answer by yourself.

4 1. stirring
2. They have the same amount of solvent.
3. Beaker (2) has more solute than Beaker (1).

5 powdered sugar

6 1. temperature 2. 45 and 30
3. powdered sugar takes time less than the other.
4. a) It takes more time to dissolve in cold water
b) Because the solubility time decreases by increasing the temperature.

Unit 3 Environmental Balance

Lesson 1 Food relationships among living organisms

P. 128

Benchmark

1 1. predation 2. cuttlefish
3. predation 4. nitrogen

2 1. (a) 2. (b) 3. (c) 4. (b)

3 1. predation 2. insectivorous
3. predation 4. mutualism

4 1. Because they can't absorb some nitrogen compounds from soil to make proteins.
2. To hide from their enemies
3. Because it ends by devouring the prey or a part of it.

Exercises on Lesson 1

P. 134

1

1. b	2. c	3. a	4. d
5. c	6. b	7. a	8. a
9. d	10. c	11. a	12. c
13. d	14. a	15. d	16. d
17. a	18. d	19. d	20. b
21. a	22. c	23. c	24. a
25. b	26. c	27. d	28. a

2 1. the sun
2. autotrophic – photosynthesis, water
3. predation , symbiosis, and saprophytism
4. predation 5. predator
6. a plant, animal 7. predation
8. mutualism 9. mimicry, camouflage
10. protein
11. To hide when attacked by enemies.
12. butterfly 13. frog
14. chameleon 15. cuttlefish

16. wasps
17. mutualism, commensalism & parasitism
18. nodular – mutualism
19. mutualism
20. canals & fissures
21. mosquitoes, ascaris
22. internal, external
23. filarial
24. smallpox
25. malaria
26. man – parasite – host
27. internal parasite
28. saprophytic
29. saprophytism
30. penicillium
31. bread mold – mushroom

3
1. (✗) predation, symbiosis & saprophytism
2. (✗) predation
3. (✓)
4. (✓)
5. (✗) commensalism, mutualism & parasitism
6. (✓)
7. (✓)
8. (✗) mutualism
9. (✗) camouflage
10. (✗) mimicry
11. (✓)
12. (✓)
13. (✓)
14. (✗) predation
15. (✓)
16. (✓)
17. (✗) bilharziasis
18. (✓)

4
1. the sun
2. green plants
3. predation
4. predator
5. prey
6. predation
7. predator
8. prey
9. autotrophic plants
10. nitrogen
11. insectivorous plants
12. camouflage
13. mimicry
14. symbiosis
15. mutualism
16. commensalism
17. parasitism
18. parasite
19. host
20. saprophytism
21. elephantiasis
22. mutualism
23. nodular bacteria
24. saprophytes
25. filarial
26. sepia
27. external parasite

5
1. autotrophic
2. green plants
3. temporary
4. predator
5. predation
6. drosera
7. sepia
8. commensalism
9. external
10. symbiosis
11. elephantiasis
12. malaria
13. saprophytism
14. remains of dead bodies of living organisms.
15. saprophytes
16. saprophyte

6
1. (1- c), (2- d), (3- a), (4- b)
2. (1- c), (2- a), (3- d), (4- b), (5- e)

7
1. Because lion feeds on deer which feeds on green plants.
2. Because they can make their food by photosynthesis process.
3. As it ends by devouring the prey.
4. Because it is a temporary relation that ends by devouring the rabbit by the wolf.
5. Because plants are autotrophic (self-feeders) as they carry out photosynthesis process.
6. They are insectivorous plants that get the required elements for making proteins as they cannot absorb the compounds to make proteins.
7. Because drosera feeds on insects to get the required elements for making proteins.
8. Because it has nodular bacteria at its roots which fix nitrogen in an inorganic form to provide the plant with.
9. As it simulates the color of its environment.
10. As camouflage to hide from enemies.
11. As a camouflage to hide from enemies.
12. To hide from their enemies.
13. As mimicry to frighten their enemies.
14. Bacteria fix nitrogen in an inorganic form to provide the plant with, while bacteria benefit from sugar made by plants during photosynthesis.
15. The tiny aquatic organisms get shelter and food from canals & fissures of the sponge which neither benefits nor is harmed.
16. The parasite causes weakness of the host, but it does not kill it, while the predator kills the prey.
17. Because the host is the source of food and shelter for the parasite.
18. Because they live on the host's body and feed by sucking blood.
19. Because it lives inside man to get food and shelter and man is harmed.
20. Because they live inside the host's body sharing its digested food or feeding on the contents of its tissues but external live on sucking the blood from the host.
21. Because they get food by decomposing food remains or bodies of dead organisms.

8
1. Death of all organisms.
2. They cannot frighten their enemies.
3. Loss of the main source of food and shelter for the parasite.
4. The legumes cannot get nitrogen to make protein.

9
1. Autotrophic organisms: (green plants) Organisms that can make their own food.
2. Predation: It is a temporary food relationship that ends by the devouring of the prey or a part of it.
3. The predator: The animal which devours another animal.
4. A prey: It is the devoured animal.
5. Symbiosis: It is a common food relationship between two different types of living organisms where one benefits from the other and does not harm it, while the other may benefit or get harmed.
6. Commensalism: It is a superficial food relationship between two living organisms where one of them benefits from the other, while the other neither benefits nor gets harmed.
7. Saprophytes: They are the living organisms that feed on dead bodies or food remains to obtain their food.

8. Mutualism: It is a food relationship between two living organisms where both get benefits.
9. Parasitism: It is a food relationship between two different kinds of living organisms where one benefits from the other, while the other one gets harmed.
10. The parasite: The living organism in parasitism which gets benefits from the other.
11. The host: The living organism in parasitism which is harmed.
12. Camouflage: It is a phenomenon by which a living organism can change its color to simulate the colors of its surrounding environment to hide from enemies.
13. Mimicry: It is a phenomenon by which harmless living organisms imitate other kinds of harmful or poisonous living organisms to frighten their enemies.
14. Insectivorous plants: They are the plants that feed on insects to obtain the required elements to make proteins.

10 1. oxygen 2. lion 3. halophila 4. lion 5. fleas

11 1. predation 2. predation 3. predation 4. mutualism 5. commensalism 6. external parasitism 7. external parasitism 8. internal parasitism 9. internal parasitism 10. saprophytism 11. saprophytism 12. saprophytism

12

Internal parasite	External parasite
1. Ascaris	1. lice.
2. Tapeworm	2. bugs.
3. Liver worm.	3. mosquitoes.

13 Answer by yourself.

14 1. Filarial 2. Mosquitoes 3. Fleas 4. Bilharzia worm 5. Ascaris worm

15 1. Decomposer 2. Internal parasite 3. Predator 4. External parasite 5. Predator 6. Decomposer 7. External parasite 8. Decomposer 9. Internal 10. Decomposer

16 1. Saprophytism 2. Predation 3. Predation 4. Parasitism 5. mutualism

TIMSS Like questions on Lesson 1

P. 143

1 b. (✓)

2 a. (✓)

3 parasitism - parasite because one of them benefits and the other gets harmed.

Lesson 2 Environmental balance

P. 149

Benchmark

1 1. living organisms - non-living things
2. disturbance

2 b. predation

3 forest

4 1. ecosystem. 2. saprophytes

5 Because they get rid of dead bodies and recycle chemical elements such as carbon nitrogen and sulphur found in these bodies back to the environment to be used by other organisms.

6 1. disturbance in the environmental balance.
2. The earth will be covered by wastes, dead bodies and food remains.

7 1. (✗) 2. (✓)

8 It's any natural area that includes living organisms and non-living organisms.

Exercises on Lesson 2

P. 151

1 1. b 2. d 3. a 4. b 5. c 6. a 7. (a,b) 8. c 9. c 10. c 11. d 12. b 13. b 14. b 15. a 16. c 17. d 18. b 19. d 20. c 21. d 22. d

2 1. living organisms – non-living things
2. natural changes – man interference
3. cutting trees – burning forests
4. water pond – forest – universe
5. environmental balance
6. disappearance of some organisms and appearance of others
7. predation 8. preys – food
9. weak or sick members
10. disturbance
11. carbon – nitrogen – sulphur - saprophytic

3 1. (✓)
2. (✗) decrease in the number of individuals over time
3. (✓) 4. (✓) 5. (✓) 6. (✓)
7. (✗) and non-living things
8. (✗) imbalance 9. (✗) water pond

10. (✗) balance
11. (✗) long period of time
12. (✗) imbalance - and natural changes
13. (✓) 14. (✗) dinosaurs
15. (✓) 16. (✓) 17. (✓)

4
1. ecosystem 2. environmental balance
3. saprophytes 4. extinction
5. predators 6. competition
7. predation

5
1. ecosystem 2. continuous
3. dinosaurs
4. the number of prey populations
5. rabbits 6. forest

6
1. Due to natural changes or man interference.
2. They complete food chains and webs. They recycle chemical elements as carbon, nitrogen and sulphur within the ecosystem to make living organisms benefit from them also they get rid of dead bodies and food remains.
3. Due to change in natural circumstances. (Climate change)
4. They complete food chains and webs. They recycle chemical elements as carbon, nitrogen and sulphur within the ecosystem to make living organisms benefit from them also they get rid of dead bodies and food remains.
5. To absorb water and salts to make photosynthesis.
6. Due to absence of predators, their number increases and there is no enough food and shelter.
7. They organize the number of prey populations by getting rid of weak or sick members to let strong ones reproduce.

7
1. The Earth's surface will be covered by dead bodies and so, carbon, nitrogen & sulphur in their bodies won't be used by other living organisms.
2. Rabbits will increase in number feeding on all plants and this causes a competition for food then they die of hunger.
3. Death of rats because of shortage of food, then owls die also.
4. Disturbance in the environmental balance occurs.
5. The Earth's surface will be covered by dead bodies thus carbon, nitrogen and sulphur in their bodies will not be used by other living organisms.
6. Leads to imbalance in the environment where populations of prey would increase in number to an extent that the available food becomes insufficient so competitions appear among their populations. They will die or will not find shelter or become weak and feeble. Thus the members of prey populations will suffer diseases which leads to their death.
7. Disappearance of some organisms as dinosaurs and the appearance of others.

8
1. The ecosystem: It is a natural area that contains some living organisms (as plants and animals) and non-living things (as air - water - soil).
2. The environmental balance: It is the balance among the components of the ecosystem.

9
1. It gets rid of dead bodies and food remains. It completes the food chains and webs. It recycles chemical elements as carbon, nitrogen and sulphur in an ecosystem to make living organisms benefit from them.
2. It organizes the numbers of preys populations by getting rid of weak or sick members to let strong ones survive and reproduce.

10
1. wheat 2. snake
3. rat, sheep 4. predation

11 Disturbance in the environmental balance by an increase in the numbers of rats with loss of crops causes competition between rats and death of hunger.

12
1. Food industry: cheese – bread – yoghurt – vinegar – alcohol.
2. Drug industry as antibiotics.
3. Leather tanning industry.
4. Making natural manure.

13 Absence of dinosaurs due to change in natural circumstances.

14 Absence of foxes causes the disturbance in the environmental balance by increasing the number of rabbits which causes a competition for food and finally they die of hunger.

TIMSS Like questions on Lesson 2

P. 157

1 c

2
a. It is not considered as an ecosystem, as it does not show the rest of relationships among other organisms, and it does not show the interaction with non-living things.
b. If organism (4) is absent then no decaying of dead organisms (accumulation of dead bodies in the ecosystem) that will lead to:
 a. spreading of diseases.
 b. the environment will not gain its elements back.
c. Organism (1) is the producer, it is the main source of energy in the food chain, as the producer absorbs the energy of sunlight and then transfers this energy to the rest of living organisms.

3
1. Yes
2. Because cutting down trees causes the environmental imbalance.

Second: Worksheets & Exams

Unit 1 Energy

Lesson 1 Light

P. 3

Worksheet (1)

1 A. 1. sunlight. 2. straight.
3. transparent material.
4. transparent – semi-transparent (translucent).
5. opaque.
6. inverted, minimized.

B. 1. It is the light energy that can be seen.
2. It is a darkened area that is formed as a result of falling of light on an opaque object.
3. They are the materials which allow some light to pass through and objects can be seen less clearly behind.

2 A. 1. a) minimized and inverted.
2. b) bigger
3. c) transparent materials.
4. c) regular reflection.

B. 1. The sunlight separates into 7 colors. and rainbow appears in the sky.
2. You can see your image.

3 A. 1. visible spectrum
2. opaque materials
3. semi-transparent (translucent) materials.
4. regular reflection 5. sun

B. 1. Because light travels in straight lines.
2. Because it reflects the sunlight that falls on its surface.
3. Because objects can be seen clearly (in full details) behind and they allow most light to pass through.

4 1. I can see the light of the candle.
2. I cannot see the light of the candle.
3. Light travels in straight lines.

Worksheet (2)

1 A. 1. bigger.
2. semi-transparent (translucent)– opaque.
3. light source – reflecting surface.
4. regular reflection and irregular reflection.
5. rainbow.

B. 1. Because no light falls on objects and no reflection occurs on our eyes, thus there is no vision.
2. Because light travels in straight lines.
3. Because the white light consists of (7) seven spectrum colors.

2 A. 1. shadow 2. transparent material
3. light reflection (regular reflection)
4. irregular reflection
5. rainbow

B. 1. d 2. f 3. c 4. a 5. b

3 A. 1. (✓)
2. (✗) The image formed through narrow holes is always inverted.
3. (✗) The formation of shadow shows that light travels in straight lines.
4. (✗) Carton is an opaque material and light cannot pass through.
5. (✗) A spoon appears broken when placed in a glass of water due to refraction of light.

B. 1. They are the materials that allow some light to travel through and things can be seen less clearly behind than the transparent one.
2. It is the reflection of light when it falls on a shiny surface.
3. It is the bouncing of light rays when it falls on a reflecting surface.
4. It is a material which doesn't let light to pass through.

C. 1. Due to light refraction.
2. Due to splitting of sunlight by drops of water forming seven-color rainbow.

4 A. 1. separation – seven spectrum colors.
2. Once these seven colors accumulate with each other, you can see the white light.
3. The visible white light is made up of seven spectrum colors.

B. 1. Light rays are reflected in different directions (Irregular reflection is formed).
2. The light rays are refracted.
3. The shadow is formed. (shadow of your hand is formed on the wall).

Lesson 2 Seeing colored objects

P. 7

Worksheet (3)

1 A. 1. transmitted light. 2. red.
3. red, green. 4. all – green one.

B. 1. (✗) It absorbs all light colors and reflects the red color only.
2. (✓) 3. (✓) 4. (✓)

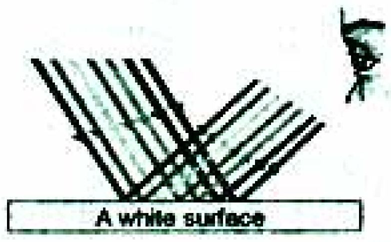
2 A. 1. a) white 2. d) reflects 3. b) black

B. 1. The black object will absorb all light colors and seems black.
2. The black surface will absorb the red light and seems as it is (black).
3. The green window absorbs all light colors and allows the green color only to transmit through, so it seems green.

3 A. 1. white light
2. colored opaque objects
3. spectrum colors
4. black opaque objects

B. 1. Because it absorbs all light colors and transmits the green light only.
2. Because it absorbs all light colors and reflects the yellow color only.

4 A.

White opaque objects	Black opaque objects
When the white light strikes the white opaque objects as shown, these objects reflect all the spectrum colors.	When the white light strikes the black opaque objects as shown, these objects absorb all the spectrum colors and do not reflect any color.
	
⇒ So, the white opaque objects appear to be white (the same color of light that falls on it).	⇒ So, the black opaque objects appear to be black.

B. 1. The white light is formed.
2. By mixing the seven spectrum colors, the white light is produced (the white light is made up of seven spectrum colors).

Worksheet (4)

1 A. 1. white light. 2. white light.
3. colored opaque object, colored transparent object.
4. the primary light colors.

B. 1. Sunlight will separate into seven spectrum colors.
2. The yellow color light is formed.
3. The white ball will appear with a green color.

2 A. 1. a. white opaque object
2. a. absorbs 3. c. green
4. c. cyan and yellow
5. b. red and blue

B. 1. reflection.
2. irregular reflection.
3. regular reflection.

C. 1. b 2. e 3. c 4. a 5. d

3 A. 1. (✗) The glass prism separates the white light into 7 colors.
2. (✗) When you mix the seven light colors, it gives white light.
3. (✓) 4. (✓)
5. (✗) Mixing red, green and blue gives the white light.

B. Answer by yourself.

4 A. 1. Because it reflects all light colors.
2. Because it absorbs all light colors.

B. 1. red.
2. The apple appears to be black behind the green sheet.
3. spectrum colors.

Lesson 3 Magnetism

P. 11

Worksheet (5)

1 A. 1. Magnesia – iron
2. magnetic – non-magnetic.
3. north pole. 4. two poles.
5. repel – attract

B. 1. It is a black rock which is one of iron ores known as magnetite.
2. They are the materials which are attracted to the magnet.
3. It is a region (space) around a magnet in which the effect of the magnetic force appears.

2 A. 1. b. natural magnet
2. d. magnetic materials 3. b. south
4. a. the clips are attracted to the two poles of the magnet
5. c. wood

B. 1. The magnet has two poles.
2. The freely moving (suspended) magnet always takes a fixed direction, which is (north-south) direction.
3. Like magnetic poles repel each other, but unlike magnetic poles attract each other.
4. The magnet is surrounded by an area called "Magnetic field".

3 A. 1. The north pole of the magnetic needle is directed towards the north direction of the Earth, while its south pole is directed towards the south direction of the Earth.
2. The magnet will take a fixed direction (north-south).
3. Iron paper clips are attracted to the magnet, while copper wire does not.

B. 1. a natural 2. magnetite
3. magnetic materials 4. iron

4 A.

Magnetic substances	Non-magnetic substances	
• Iron nails	• Plastic	• Glass
• Paper clips	• Copper	• Wood
• Iron car	• Aluminum	
• Pins	• Gold	

B. 1. Because they are attracted to the magnet.
2. Because most of the magnetic force is concentrated at the 2 poles of the magnet.

Worksheet (6)

1 A. 1. (✓) 2. (✓) 3. (✗) 4. (✓)

B. 1. The north pole will be attracted to the south pole.
2. They will repel each other.

2 A. 1. magnetic field.
2. south pole. 3. compass.
4. magnetic force. 5. compass.

B. 1. Because steel and cobalt are magnetic materials.
2. Because metallic paper clips are magnetic materials, while copper wires are non-magnetic materials.

3 A. 1. The regions of the magnet where most of the attraction force is concentrated.
2. They are materials which do not attract to the magnet.
3. It is the force by which the magnet attracts some materials.
B. approach a bar magnet to the two pieces of metals:
➡ The piece made of iron will be attracted to the magnet.
➡ The piece made of aluminum will not be attracted to the magnet.

4 A. 1. c 2. e 3. d 4. b 5. a
B. 1. north pole
2. middle of the magnet
3. south pole 4. B

Lesson 4 Magnetism and electricity

P. 15

Worksheet (7)

1 A. 1. electromagnet 2. increases
3. electric, magnetic
4. electric bell, cranes 5. cranes
B. The magnetic force of the electromagnet can be increased by.
a. Increasing the number of coil turns.
b. Increasing the number of batteries.

2 A. 1. a 2. b 3. d 4. b
B.1. and battery 2. increase
3. small dynamo

3 A .1. electromagnet 2. dynamo
3. huge dynamo 4. cranes
B.1. The magnetic force will increase.
2. The magnetic force will increase.

4 A. 1. Because the electric current intensity increases by increasing the number of batteries, so magnetic force increases.
2. Because iron nail changes into a temporary magnet.
3. Because it loses its magnetism when cutting electric current.

B.

	A	B
1. The name of device	Electromagnet	Dynamo
2.. The idea of work.	electric energy changes into magnetic energy	mechanical energy changes into electric energy
3. Uses	T.V, disc drive	lights the bulb of bicycle. lighting cities

Worksheet (8)

1 A. 1. kinetic , electric
2. the turns of coil, using strong magnet
3. small dynamo 4. magnetic
5. electromagnet
B. Answer by yourself.

2 A. 1. d 2. a 3. d 4. b
5. c 6. d 7. d
B. The dynamo changes the mechanical energy into electric energy.

3 A. 1. (✗) strong 2. (✓) 3. (✓)
4. (✗) increases 5.(✓) 6. (✓)
B. Answer by yourself.

4 A.

P.O.C.	Electromagnet	Dynamo
1. Scientific idea	changes the electric energy into magnetic energy.	changes the kinetic energy into electric energy.
2. Structure	coil - soft iron nail - battery.	magnet - coil.

B. 1. (a) magnet (b) copper coil
2. electric current
3. kinetic , electric 4. dynamo

TIMSS Like questions on Unit 1

P. 19

1 a. steel - magnetic b. closed
c. ring, bar d. magnetism
e. keepers

2 a. south b. repel c. attract

3 a. electromagnet b. magnetic pole
c. ammeter d. magnetic field line

4 1. south pole 2. Answer by yourself.
3. electromagnet 4. a magnetic material
5. switched on 6. increasing

5 2

Al-Adwaa General Tests on Unit 1

P. 21

Test 1

1 A. 1. rainbow. 2. magenta light color.
3. electromagnet. 4. white light.
5. spectrum colors.
B. 1. Because these materials are attracted to the magnet.
2. Because it reflects all light colors.

3. Because carton paper is an opaque material that does not allow the light to travel through.
4. Due to moving a coil between two poles of a magnet which generates electricity.

2 A. 1. seven - spectrum colors.
2. white light.
3. two - north - south.
4. absorbs - reflect.
5. a smooth and bright.

B. 1. You can see the picture less clearly.
2. Mixing the green and blue lights gives (yields) the cyan light color.
3. A magnet takes a fixed direction (north-south).
4. The blue bottle absorbs all the spectrum colors which fall on it and allows the blue light only to transmit through.

3 A. 1. wrought iron
2. minimized and inverted
3. yellow 4. its middle
5. white

B. 1. It is used to make the electric mixer.
2. It is used in electric power stations to generate electricity.
3. It is used in lifting heavy objects.

4 A. 1. The magnet has two poles.
2. The freely moving magnet always takes a fixed direction, which is (north-south).
3. Like magnetic poles repel each other, but unlike magnetic poles attract each other.
4. The magnet is surrounded by an area called "Magnetic field".

B. Answer by yourself.

C. (a) soft iron nail.
(b) electric wire (coil). (c) battery.

Test 2

1 A. 1. mechanical energy
2. Magnesia - iron 3. sunlight
4. red - blue

B. 1. fruit 2. yellow
3. reflect 4. north-south

2 A.1. (✗) 2. (✓) 3. (✗) 4. (✓)

B.1. The electric current is produced.
2. The image is formed.
3. The magnet takes a fixed direction (north-south).
4. The spoon seems broken due to light reflection.

3 A. 1. light refraction.
2. faster than.
3. Due to light refraction.

B. 1. d 2. f 3. c 4. a 5. b

4 A.

Regular reflection	Irregular reflection
It is light reflection when light rays fall on a smooth and shiny reflecting surface where light rays are reflected in one direction.	It is light reflection when light rays fall on a rough surface, where light rays are reflected in different directions.

B. 1. Because they allow most of light to pass through and we can see objects through them clearly.
2. Due to separation of white light into 7 spectrum colors.
3. To increase intensity of electric current so its magnetic force increases.
4. Because they are not attracted to the magnet.

Test 3

1 A. 1. seven 2. mechanical - electric
3. its two poles
4. red - violet 5. 50.

B. 1. secondary light colors.
2. irregular reflection.
3. triangular glass prism.
4. compass.
5. black opaque object.

2 A. 1. Because metallic paper clips are magnetic materials, while copper wires are non-magnetic materials.
2. Because it is produced by mixing two primary light colors (red & green).
3. Because it reflects the sunlight that falls on its surface.
4. Because the plane mirror reflects the falling light on it to reach my eyes causing the vision.
5. Because the two poles of its magnetic needle always refer to the north and south directions of the Earth.

B. 1. (✓) 2. (✗) 3. (✓) 4. (✗) 5. (✓)

3 A 1. I see minimized and inverted image for the flame of candle.
2. Because light travels in straight lines.

B 1. The compass is used to identify the four main geographical directions.
2. It is used for making the electric bell or cranes.

4 A. 1. Paper clips will be attracted to the magnet.
2. The two poles will repel each other.

B. 1. It is used in separation of white light into 7 spectrum colors.
2. It is used in cranes to lift heavy steel blocks from one place to another.
3. It is used in generating electricity from kinetic energy.

2 A.

Translucent materials	Opaque materials
They are the materials which allow some light to pass through and objects can be seen less clearly behind than the transparent.	They are the materials that do not allow light to pass through and objects cannot be seen behind.
Examples	
Tissue paper	Wood

B. 1. You are going to see your image which is formed on the frosted glass less clearly.
2. You will see an equal image for you on an equal distance. (The distance between you and the mirror is equal to the distance between the image and the mirror surface).
3. The black object absorbs all light colors and no light will be reflected.
4. It seems black, because banana absorbs all color lights except yellow color which it reflects and doesn't transmit through the red glass sheet.

3 A. 1. a 2. a 3. a 4. d
B. 1. d 2. f 3. c 4. a 5. b

4 A. 1. (✗) 2. (✓) 3. (✓)
B. 1. Magnetic materials: They are materials that attract to magent.
2. They are the materials which allow some light to pass through and objects can be seen less clearly through than the transparent.
3. Primary light colors: They are colored lights which cannot be produced by mixing two other colored lights.
4. Non-magnetic materials: They are materials that don't get attracted to magnet.

Exam 4

1 A. 1. rainbow. 2. reflect.
3. poles. 4. transparent.
5. repel - attract.
B. 1. Because it allows some light to pass.
2. Because it doesn't get attracted to magnet.

2 A. 1. natural magnet.
2. secondary light color.
3. opaque material.
4. visible spectrum. 5. shadow.
B. 1. Due to light refraction.
2. They will get attracted to each other.

3 A. 1. (✓) 2. (✗) 3. (✗) 4. (✗) 5. (✓)
B. Answer by yourself.

4 A. Answer by yourself.
B. 1. white opaque object. 2. north- south.
3. Faraday. 4. refracts.

Exam 5

1 A. 1. seven - prism 2. reflect
3. yellow - magenta - cyan
4. wood - chalk - glass
5. electric power
B. 1. The needle of the compass deflects.
2. They will get attracted to each other.

2 A. 1. irregular reflection.
2. two poles.
3. William Gilbert.
4. magnetic force.
5. regular reflection.
B. Answer by yourself.

3 A. 1. (✓) 2. (✗) 3. (✓) 4. (✗)
B. Answer by yourself.

4 A. 1. two poles. 2. iron. 3. sun.
B. Answer by yourself.

Unit 2 Mixtures

Lesson 1 Mixtures

P. 37

Worksheet (9)

1 A. 1. pure substances – mixtures
2. carbon dioxide in a sugary solution
3. magnetic attraction.
4. shaking, stirring
B. 1.Pure substances: they are the substances which are made of only one type of identical particles.
2. Mixture: It is the substance that consists of more than one type of particles.
3. A solid-solid mixture: It consists of two or more different solid materials.
4. A liquid-liquid mixture: It consists of two or more different liquids.

2 A. 1. a 2. c 3. d 4. a
B. 1. b 2. a 3. d 4. e

3 A. 1. mixtures 2. mixtures
3. atmospheric air
4. mineral water 5. soda water
B. 1. Because the components of air keep their properties and it consists of more than one type of particles. (oxygen - carbon dioxide - nitrogen)

2. Because it is made up of only one type of identical particles.
3. Because sand does not dissolve in water.

4 A. 1. A homogeneous salty solution is formed.
2. A heterogeneous solution is formed.
B. 1. concrete. 2. apple juice.

Worksheet (10)

1 A. 1. mixed , ratio
2. shaking, grinding 3. solid, magnetic
4. solid, soluble 5. liquid
B. 1. oil and water 2. stirring
3. salt and water 4. shaking
5. oil

2 A. 1. (✓) 2. (✗) separating funnel
3. (✗) shaking 4. (✗) insoluble
5. (✗) salt from water
B. 1. Because it consists of more than one type of solids.
2. Because it consists of more than one type of liquids.
3. Because it consists of solid and liquid matter.

3 A. 1. soda water 2. solution
3. solubility 4. evaporation
5. evaporation
B. 1. d 2. e 3. a 4. b 5. c

4 A. 1. separation of a mixture of sand-water.
2. separation of a mixture of oil-water.
3. separation of the magnetic substance from mixture.
B.1. Separating funnel.
2. Because this tool is used to separate heterogeneous mixtures.
3. separate oil from water (heterogeneous liquid mixtures.

Lesson 2 Solutions

P. 41

Worksheet (11)

1 A. 1. homogeneous mixture
2. solvent/solute
3. solid/liquid 4. Answer by yourself.
5. suspension/suspended
6. mud in water/natural orange juice
7. stirring
B. 1. A type of mixtures in which we cannot distinguish between the components.
2. It is the substance in which a solute disperses or dissolves.
3. It is the process by which a solute dissolves in a solvent leading to the disappearance of the solute.

2 A. 1. (✗) homogeneous 2. (✓) 3. (✓)
4. (✓) 5. (✗) increase 6. (✓)
B. 1. Salt will be dissolved in the water forming a salty solution.
2. The sugar in the largest amount of water will dissolve faster than the other beaker that contains the less amount of water.

3 A. 1. Because its components cannot be distinguished.
2. Because its components can be distinguished.
3. It's a homogeneous mixture whose components can't be distinguished.
B. 1. decreases 2. evaporation
3. increases

4 A. Answer by yourself.
B. Activity on page 104 in the Main Book.

Worksheet (12)

1 A. 1. water 2. suspension/filtration
3. decrease 4. the amount of solvent
5. decrease
B. 1. The beaker whose temperature is higher dissolves faster than the other.
2. Solubility time will increase.
3. Solubility process will increase.

2 A. 1. heterogeneous mixture 2. solvent
3. solution 4. solute
B. 1. The quantity of salt in hot water. Because by heating the solubility process increases.
2. The quantity of sugar in water dissolved with stirring because by stirring the solubility process increases.
3. A quantity of salt in 300 ml of water. Because by increasing the solvent, the solubility process increases.

3 A. (1- c), (2- d), (3- a), (4- b)
B. 1. Because it consists of more than one type of particles (solute and solvent).
2. Because mixtures are of 2 types: homogeneous and heterogeneous.
3. Because water has the ability to dissolve a lot of substances.

4 A. 1. more solvent (water). 2. increases.
B. 1

Mixture	Solution
It is a substance that is made up of more than one type of particles. A mixture can be classified into: Homogeneous mixture / Heterogeneous mixture	It is a homogeneous mixture in which the solute breaks down into its most basic particles that spread throughout the solvent.

2.

Natural orange juice	Apple juice
Heterogeneous mixture	Homogeneous mixture

3.

Solvent	Solute
It is the substance in which a solute disappears or dissolves.	It is the substance which dissolves in a solvent.

4.

Grinding	Shaking
It is used to form a mixture of salt and pepper (solid materials).	It is used to form a mixture of strawberry juice and banana juice. (liquid materials).

TIMSS Like questions on Unit 2

P. 45

1 A. filtration process
B. evaporation process

2 The container that contains powder due to increasing the surface area exposed to the solvent.

3 (✓)

4 A. solvent - solvent - solute
B. evaporation.
C. The concentration increases.

5 A. A. sugar B. coffee
C. baking soda D. sand E. flour
B. disappeared.
C. Solid (c) - because carbon dioxide gas evolved.

Al-Adwaa General Tests on Unit 2

P. 47

Test 1

1 A. 1. solubility 2. mixture
3. evaporation 4. stirring
B. (1 – c), (2 – d), (3 – a), (4 – b)

2 A. 1. decreases 2. shaking
3. magnetic attraction 4. solution
B. 1. c 2. c 3. b

3 A. 1. Because the solution consists of more than one type of particles (solute and solvent).
2. Because the components of this mixture can be distinguished (chalk - water).
3. Because the solubility process increases by increasing the temperature.
B.1. A pure substance: it is the substance that is made up of only one type of identical particles.
2. A mixture: it is the substance that consists of more than one type of particles.
3. A solid-solid mixture: a mixture that consists of two or more different solid materials.
4. A liquid-liquid mixture: a mixture that consists of two or more different liquids.

4 A. 1. A solid-solid mixture is formed
2. A gaseous-liquid mixture is formed.
3. The solubility time increases.
4. Solubility process increases.
B. Answer by yourself.

Test 2

1 A. filtration - evaporation - separating funnel - magnetic attraction.
B. 1. (✗) 2. (✓) 3. (✓) 4. (✗) 5. (✓)

2 A. 1. salad dish 2. oil-water
3. atmospheric air
B. 1. water 2. evaporation
3. solution 4. filtration

3 A. 1. Because they are made of only one type of identical particles.
2. Because they are made of more than one type of particles.
3. Because it consists of different gases such as nitrogen, oxygen and carbon dioxide.
4. Because we can distinguish between its components.

B.

Solute	Solvent
It is the substance which dissolves in a solvent.	It is the substance in which a solute disperses and dissolves.

4 A. 1. The water will evaporate and salt will remain.
2. Solubility process increases.
3. Solubility process increases.
4. Heterogeneous mixture is fromed.
B. Answer by yourself.

Test 3

1 A. 1. We use the filtration method.
2. Separating funnel is used.
3. Evaporation process is used.
B. 1. solubility 2. solution
3. pure substances 4. stirring

2 A.1. filtration 2. solute 3. temperature
B.1. A salty solution is formed.
2. Iron filings are attracted to magnet and salt remains.
3. Alloys are formed.
4. Salt dissolves more rapidly than sugar (solubility speed changes).

3 A. 1. A mixture: it is the substance that consists of more than one type of particles.
2. Homogeneous mixtures: mixtures whose components cannot be distinguished.
3. Heterogeneous mixtures: mixtures whose components can be distinguished.

B. 1. (✓) 2. (✗) 3. (✓) 4. (✓)

4 A.

Homogeneous mixture	Heterogeneous mixture
A type of mixtures in which we cannot distinguish between the components.	A type of mixtures in which we can distinguish between the components.

B. 1. Because we can distinguish between its components.
2. Because it consists of more than one type of particles.
3. Because it has the ability to dissolve thousands of particles of a solute in it.
4. Because the solubility process increases and takes short time by heating and stirring.

Unit 3 Environmental Balance

Lesson 1 Food relationships among living organisms

P. 53

Worksheet (13)

1 A. 1. symbiosis, saprophytism 2. the sun
3. predation, mutualism
4. autotrophic – photosynthesis
5. drosera – dionaea – halophila

B. 1. Autotrophic organisms: they are living organisms that can make their own food by themselves.
2. Predation: it is a food relationship among living organisms, where one living organism devours another one.
3. Predator: it is the living organism which devours the living organism.
4. Prey: it is the living organism which is devoured.

2 A. 1. predation 2. sepia 3. chameleon
4. saprophytes 5. mutualism

B. 1. autotrophic 2. sepia
3. predator 4. predation

3 A. 1. Because lions feed on deer which feed on plants.
2. To get nitrogen to make proteins.
3. As plants can make its own food by photosynthesis.
4. Because it has nodular bacteria in its roots to fix nitrogen in an inorganic form for the plant.
5. It feeds on insects to get the required elements for making proteins.

B.

P.O.C.	Camouflage	Mimicry
Definition	A phenomenon in which the living organism protects itself from enemies by changing its color of its surrounding environment.	A phenomenon in which the harmless living organisms imitate other harmful or poisonous living organisms to frighten their enemies and escape from them.
Ex.	Frog and chameleon	Some bees that look like wasps in forming lines.

4 A. 1. They cannot frighten their enemies.
2. No life as all organisms depend on plants as a source of food directly or indirectly and plants will die if no photosynthesis.

B. Examples on page 125 in the Main Book.

Worksheet (14)

1 A. 1. insects 2. camouflage
3. predation – saprophytism 4. indirectly

B. 1. Because a chameleon changes its color to simulate the color of the surrounding environment.
2. Because the parasite will lose its source of food and shelter.
3. Because they live externally on the host's body and feed by sucking its blood.
4. Because they get their food by decomposing food remains or bodies of dead organisms.

2 A. 1. d 2. c 3. a 4. c

B. 1. A dark green layer is formed on the bread; that is, the bread will be rotten.
2. The Earth's surface will be covered with the bodies of dead organisms.
3. Sepia ejects black fluid to escape from its enemies.
4. A chameleon cannot hide from their enemies.

3 A. 1. protein 2. commensalism
3. mimicry 4. spiders

B. 1. (e) 2. (d) 3. (b) 4. (c) 5. (a)

4 A. 1. (✗) internal 2. (✓)
3. (✗) mutualism, commensalism & parasitism 4. (✓)

B. 1. a. Tiny aquatic organisms get shelter and food from the canals and fissures of a sponge.
b. They change some food remains to vitamin B.
2. (1) saprophytism (2) predation
(3) predation (4) parasitism

Lesson 2 Environmental balance

P. 57

Worksheet (15)

1 A. 1. ecosystem 2. large
3. water 4. soil 5. dinosaurs
B. 1. Animals feed on the plants directly or indirectly.
2. Fungus decompses the animals after their death and recycle the chemical elements to the soil.

2 A. 1. small 2. (a, b)
3. change in natural conditions
4. organizes 5. environmental imbalance
B. 1. getting rid of the bodies of dead organisms by decomposing them.
2. recycling the chemical elements found in the bodies of dead organisms.

3 A. 1. ecosystem 2. predation
3. environmental balance
4. the universe
B. 1. to make photosynthesis.
2. to recycle elements such as carbon, nitrogen and sulphur in nature.
3. in food industries such as cheese and yoghurt, in drugs industry such as antibiotics and in leather tanning industry.
4. to keep the environmental balance.

4 A. 1. This leads to spreading of rats with loss of crops.
2. Increase in number of prey populations and the food resources become insufficient for prey populations leading to the competition between members of prey populations so they will die.
3. Disturbance in the environmental balance.
4. Life will be stopped as new plants cannot find elements to grow.
B. Answer by yourself.

Worksheet (16)

1 A. 1. c 2. d 3. b 4. d
B. 1. a. Getting rid of the bodies of dead organisms by decomposing them.
b. Recycling the chemical elements found in the bodies of dead organisms.
2. - Predation relationship plays an important role in keeping the environmental balance.
- Predation organizes the number of prey populations.

2 A. 1. (✗) balance 2. (✗) dinosaurs
3. (✗) imbalance
4. (✗) imbalance 5. (✓)
B. 1. Due to the change in natural conditions in the ecosystem that causes the disappearance of dinosaurs.
2. Because they make their own food during photosynthesis process.
3. Due to the insufficient food resources for prey populations.

3 A. 1. predation 2. continuous
3. energy 4. small
B. 1. predator 2. competition
3. saprophytism

4 A. 1. Ecosystem: it is a natural area including living organisms and non-living things.
2. Environmental balance: it is the balance among the components of the ecosystem.
B.1. Food industry such as cheese, bread, yoghurt, vinegar and alcohol.
2. Drug industry such as antibiotics.
3. Leather tanning industry.
4. Making of the natural manure.

TIMSS Like questions on Unit 3

P. 61

1 1. b 2. d 3. c 4. e 5. a

2 A. (i) light energy to chemical energy.
(ii) chemical energy.
B. bacteria.

3 A. (i) The arrows show the direction of energy flow (the second organism feeds on the first one).
(ii) zebra - gazelle. (iii) cheetah - lion.
B. Draw by yourself.

4 1. parasite 2. host 3. filarial worm 4. bug

Al-Adwaa General Tests on Unit 3

P. 63

Test 1

1 A. 1. plant 2. shelter 3. camouflage
4. spider
B. 1. (✗) 2. (✓) 3. (✓) 4. (✗) 5. (✓)

2 A. 1. parasite 2. external parasite
3. inorganic 4. parasite 5. temporary

B. 1. predation 2. mutualism
3. saprophytism 4. external parasitism
5. external parasitism

3 A. 1. parasitism 2. anemia
3. insectivorous plants
4. environmental balance

B. 1. Predation: it is a temporary food relationship that ends by the devouring of the prey or a part of it.
2. A predator: the animal which devours another animal.
3. The host: the living organism in parasitism which is harmed.
4. External parasitism: it is a food relationship in which the parasite lives externally on the host's body and feeds by sucking the blood of the host and conveys diseases to it.

4 A. 1. Because plants are autotrophic organisms that can make their own food by photosynthesis process.
2. Because lion feeds on deer.
3. To hide from its enemies.
4. To hide from its enemies.

B.

P.O.C.	Commensalism	Mutualism
Definition	It is a food relationship between two living organisms, where one of them benefits from the other, while the other neither gets benefit nor is harmed.	It's a food relationship between two living organisms where each one benefits from the other.
Example	The relation between the sponge and tiny aquatic living organisms.	The relation between nodular bacteria and leguminous plants

Test 2

1 A. 1. dead 2. external
3. shelter – fissures
4. mushroom fungus, bread mold fungus

B.1. predation 2. jawless lamprey
3. anemia 4. penicillium

2 A. 1. saprophytes 2. saprophytes
3. green plants 4. soil 5. continuous

B.1. Because it ends by devouring the prey
2. To get the required elements (nitrogen) to make proteins.
3. As it devours insects.

3 A.

Predation	Saprophytism
1. It organizes the number of prey populations to keep the ecosystem balanced. 2. Predators get rid of weak or sick members and let strong ones in prey populations to preserve their existence and to reproduce adding strong members to the populations.	As bacteria and fungi decompose dead bodies, wastes and food remains. These scavengers offer great services: 1. Completing the food chains and webs. 2. The recycling of the chemical elements such as carbon, nitrogen and sulphur within the ecosystem to make living organisms benefit from them. 3. Getting rid of dead bodies, wastes and food remains.

B.

1.	Mimicry	A phenomenon by which the harmless living organisms imitate other harmful or poisonous living organisms to frighten their enemies and escape from them.
2.	Symbiosis	It is a common food relationship between two different types of living organisms; one of them benefits from the other and the other may benefit (mutualism) or neither benefits nor is harmed (commensalism) or is harmed (parasitism).
3.	Mutualism	It is a food relationship in which each organism gets benefit (in the form of food) from the other and is not harmed.
4.	Prey	It's the animal which is devoured by predator.

4 A. 1. They will not be able to take their needs of nitrogen and will not be able to grow and form proteins.
2. The mosquito absorbs your blood and may convey malaria disease to you.
3. This causes the environmental imbalance.
4. This may lead to extinction of some living organisms.

B. 1. (✓) 2. (✓)
3. (✓) 4. (✗) (imbalance)

Test 3

1 A. 1. insectivorous 2. nodular
3. predation 4. internal
5. protein

B. 1. host 2. saprophyte
3. predators 4. drosera
5. saprophytes

2 A. 1. Enviromental imbalance occurs.
2. They increase in number and compete for food and then they die of hunger and this will cause disturbance in the environmental balance.
3. It will cause an increase in the numbers of rats and then loss of crops leading to disturbance in the environmental balance.

B. 1. ecosystem 2. mutualism
3. penicillium. 4. fleas 5. mosquitoes

3 A.

P.O.C.	Parasitism	Commensalism
Definition	It is a food relationship between two different kinds of living organisms in which one benefits, while the other is harmed.	It is a superficial food relationship between two living organisms; one of them benefits from the other, while the other neither gets benefit nor is harmed.
Example	The relation between bilharzia worm and man.	The relation between the sponge and tiny aquatic organisms.

B. 1. Internal parasitism: it is a food relationship in which the parasite lives internally inside the host's body and shares the host's digested food or feeds on its tissues and cells.
2. Saprophytism: it is a food relationship in which the saprophytes (decomposers) get their food by decomposing food remains or bodies of dead organisms.
3. The ecosystem: it is a natural area that contains some living organisms (such as plants and animals) and non-living things (such as air, water and soil).
4. The environmental imbalance: it is any disturbance that affects the environmental balance.

4 A. 1. It changes its color to simulate the color of the surrounding environment.
2. Because tiny aquatic organisms get shelter and food from the canals and fissures of a sponge which neither benefits nor is harmed.
3. Because bacteria fix nitrogen in an organic form to provide the plant with it and bacteria benefit from sugars made by plants during photosynthesis.
4. Because the parasite depends on the host completely to get food causing its weakness, but not death (does not kill) as predators kill prey.

B. 1. (✗) (predation) 2. (✓)
3. (✗) (imbalance)

Exams on the second part of the first term

P. 69

Exam 1

1 A. 1. ecosystem
2. decompose
3. predation
4. grinding - stirring - shaking

B.1. predation
2. mutualism

2 A.1. water and lemon juice
2. separating funnel
3. camouflage
4. dinosaurs

B.1. Making a disturbance in the environmental balance.
2. Water will evaporate and salt will remain.

3 A. 1. solubility process
2. decomposer
3. (solid-liquid) mixture as salty solution
4. salty solution.
5. internal parasite

B. 1. separating funnel.
2. filtration.

4 A. 1. (✗) 2. (✗) 3. (✓) 4. (✗)
B. Answer by yourself.

Exam 2

1 A. 1. fungus 2. filtration
3. solution 4. solute

B. 1. Because it ends by devouring the prey.
2. Answer by yourself.

2 A. 1. solubility process.
2. environmental balance. 3. pure.
4. solvent. 5. predation.

B. Answer by yourself.

3 A. 1. (✗) 2. (✓) 3. (✗) 4. (✓) 5. (✓)
B. 1. seperating funnel.
2. magnetic attraction.

4 A. 1. (c) 2. (a) 3. (d) 4. (e)
B. Answer by yourself.

Exam 3

1 1. mixture 2. solid - soluble
3. electromagnet 4. mixture
5. saprophytism 6. producer
7. heterogeneous
8. environmental balance

2 A. 1. sepia. 2. sepia.
3. external. 4. increase.
5. guard. 6. magnetic attraction.
B. Answer by yourself.

3 A. 1. camouflage - mimicry
2. ecosystem
3. solubility process
4. external parasite.
B. 1. (c) 2. (a) 3. (d) 4. (c).

4 A. 1. Because it consists of more than one type.
2. Because it ends by devouring the prey.
B. 1. The steel gets attracted to the magnet.
2. Causing disturbance in environmental balance.

Exam 4

1 A.1. predation 2. predation
3. seprating funnel 4. water
5. plants - animal
B. Answer by yourself

2 A. 1. salty pans. 2. ecosystem.
3. solubility process. 4. decomposer.
B. Answer by yourself.

3 A. 1. increases. 2. decomposer.
3. ocean
B. 1. Because it consists of more than one type of particles.
2. Answer by yourself.

4 A. 1. solute. 2. (a) and (b).
3. sepia. 4. ascaris.
B. 1. (c) 2. (a) 3. (d) 4. (b) 5. (e).

Exam 5

1 A. 1. (✗) 2. (✗) 3. (✓) 4. (✓) 5. (✗)
B. 1. We can't get rid of dead body.
2. Making soda water.

2 A. 1. different gases. 2. drosera.
3. constant.
4. separating funnel.
B. 1. Because it ends by devouring the prey.
2. Because it consists of one particle but mineral water consists of more than one type of substances.

3 A. 1. solubility process.
2. parasitism.
3. ecosystem.
4. elephantiasis.
B. Answer by yourself.

4 A. 1. proteins
2. evaporation - filtration
3. burning forest 4. decomposer
5. mixture 6. decrease
7. mixture
B. Answer by yourself.

School Exams on the First Term

2016/2017 P. 79

1 Cairo - Cairo Experimental Edu. Zone.

1 A. 1. mimicry - camouflage.
2. lighting cities - operating factories.
3. poles.
B. magnetic field:
It is the space around a magnet where the effect of the magnetic force appears.

2 A.1. (✗) 2. (✗) 3. (✗) 4. (✓)
B. 1. sun
2. shake

3 1. mixture.
2. decomposer.
3. light refraction.
4. grinding.

4 A. 1. seawater. 2. regularly.
3. red.
4. predation.
B. 1. Because thousands of substances dissolve in it.
2. Because it doesn't get attracted to the magnet.

2 Cairo - Experimental L. S.

1 A. 1. semi-transparent - opaque.
2. repel - attract.
3. mutualism.
4. increasing.

B. 1. To seperate heterogeneous liquids such as (oil - water).
2. To identify the main four directions.

2 A. 1. nonmagentic material.
2. magnetic field. 3. predation.
4. ecosystem. 5. solute
B. 1. The magenta light color is produced.
2. The earth's surface would be covered with dead bodies.

3 A. 1. straight. 2. irregular. 3. cyan.
4. liver worm. 5. evaporation.
B. 1. To hide from their enemies.
2. Due to light refraction.

4 A. 1. producer. 2. drosera.
3. camouflage. 4. mixture.
B.a. Answer by yourself.
b. Answer by yourself.
1. dynamo.
2. kinetic - electric.

3 Cairo - Public L. S.

1 A. 1. red - blue.
2. solute - solvent.
3. commensalism - mutualism.
4. repel - attract.
B. 1. two poles.
2. predator.
3. pure substance.
4. electromagnet.

2 A. 1. transmits. 2. mimicry.
3. plant. 4. inverted.
B. 1. electromagnet.
2. solute. 3. host. 4. transparent.

3 A. 1. (✓) 2. (✓) 3. (✗) 4. (✓)
5. (✓) 6. (✓)
B. 1. To increase the force of electromagnet.
2. Because light travels in straight lines.

4 A. 1. (c) 2. (a) 3. (d) 4. (b)
B. 1. predation. 2. mutualism.
3. parasitism. 4. saprophytism.

4 Cairo - Maadi Educational Directorate.

1 1. glass - water. 2. green - blue.
3. electric bell - mixer. 4. stirring

2 A. 1. light refraction.
2. separating funnel.
3. distilled water.
4. mutualism.
B. 1. Magenta light color is produced.
2. They will get attracted to each other.

3 A. 1. magnetic field. 2. ecosystem.
3. dynamo. 4. shadow.
B. 1. Because they don't get attracted to the magnet.
2. To hide from its enemies.

4 A. 1. (✗) 2. (✓) 3. (✓) 4. (✓) 5. (✗)
B. 1. (b) 2. (c) 3. (a)

5 Cairo - Science Inspectorate.

1 A. 1. transparent materials. 2. repel - attract.
3. seven spectrum colors. 4. grinding.
B.1. (✓) 2. (✗) 3. (✓)

2 A. 1. light reflection. 2. two poles
3. ecosystem. 4. compass.
5. shadow.
B.1. Because it doesn't get attracted to the magnet.
2. Because it can't be produced by mixing two colors.

3 A. 1. copper. 2. opaque.
3. iron. 4. white
5. solute.
B.1. lion.
2. salty solution.

4 A. 1. secondary. 2. increase.
3. mixture. 4. white.
5. filtration.
B.1. paper.
2. carton.
3. butterfly.

6 Cairo - East Nasr City Edu. Zone - El Manhal Lang. - School.

1 A. 1. (a) 2. (b) 3. (c) 4. (b)
B. 1. (✗) 2. (✗) 3. (✓) 4. (✓)

2 A. 1. mutualism.
2. magnetic field.
3. transparent material.
4. separating funnel.
5. magnetic material.
6. ecosystem.
B.1. Because it absorbs all colors except red color which it reflects.
2. Because it consists of more than one type of particles.

3 1. stirring - grinding - shaking.
2. yellow - cyan.
3. all colors - green.
4. kinetic - electric.
5. green - blue.
6. lion - drosera.
7. solute - solvent

4 A. 1. two poles 2. camouflage
3. semi-transparent.
4. internal
B. A. 1. (d) 2. (a) 3. (b) 4. (c)

7 Giza - North Giza Educational Directorate.

1 A. 1. straight 2. magnetic field
3. milk 4. electric - magnetic
5. shadow 6. internal
B. It is used to identify the main four directions.

2 A. 1. unlike. 2. predation.
3. opaque. 4. red
B. 1. mutualism.
2. parasitism.

3 A. 1. Because it consists of more than one type of particles.
2. Because it gets attracted to the magnet.
B. 1. glass prism. 2. primary.
3. producers. 4. iron.

4 A. 1. semi-trasparent 2. evaporation
3. rainbow 4. predator.
B. 1. magnetic attraction.
2. separating funnel.

8 Qalubia - Science Inspectorate.

1 A. 1. straight. 2. transparent
3. yellow. 4. malaria.
5. dead organisms 6. black.
B. 1. Due to light refraction.
2. Because it consists of more than one type of particles.

2 A.1. repel - attract.
2. stirring - shaking.
3. electric - magnetic.
4. green - blue.
5. solvent - solute.
6. symbiosis - saprophytisim.
B. 1. lighting the bulb of the bicycle.
2. used in making electric bell.

3 A. 1. shadow 2. magnetic field
3. ecosystem 4. predation.
5. magnetic material. 6. yellow.
B. 1. (d) 2. (c) 3. (a) 4. (b)

4 A. 1. mixture. 2. water.
3. reflected. 4. internal.
5. two poles. 6. homogeneous.
B. 1. a- mosquito. b- internal parasite.
2. a- drosera.
b- Animals undergo camouflage.

9 Menofia - Shebeen El Koom Directorate.

1 1. rainbow. 2. kinetic - electric.
3. inverted - minimized.
4. magnetic attraction
5. camouflage - mimicry.

2 A. 1. magnetic material
2. mixture. 3. prey.
4. solubility process. 5. ecosystem.
6. magnetic field.
B. 1. It seems black.
2. forming a shadow.

3 A. 1. yellow 2. chocolate.
3. faster than. 4. The needle deflects.
B. 1. (c) 2. (a) 3. (d) 4. (b)

4 A. 1. Because it doesn't allow the light to pass through.
2. Because it identifies the main four directions.
B. 1. fleas. 2. increase.
3. attract. 4. nitrogen.
5. reflect.

10 Dakahlia - Dakahlia Educational Directorate.

1 A. 1. (c) 2. (a) 3. (b) 4. (c)
B. 1. Because rain drops act as the prism which seperates sunlight into seven spectrum colors.
2. Because they are producers.
3. Because if the host dies, the parasite loses its shelter and food.
4. Because it consists of more than one type.

2 A. 1. (✓) 2. (✗) 3. (✗) 4. (✗) 5. (✓)
B. 1. commensalism 2. secondary color
3. compass.
4. (ags - liquid) mixture such as (soda water).

3 A. 1. temperature. 2. seven spectrum colors
3. white light. 4. decomposer
B. 1. Answer by yourself.
2. a- magnetic attraction.
b- filtration.
c- evaporation.

4 A. Answer by yourself.
B. Answer by yourself.

11 Behera - Kafr El Dawar E. Zone

1 Answer by yourself.

2 A. 1. electric 2. carton
3. white 4. light refraction
B. Answer by yourself.

3 A. 1. light reflection
2. magnetic field
3. solute
4. ecosystem
B. 1. Due to the absorption of red color which is reflected by the apple through the blue glass.
2. To make self-defence against predation.

4 A. Answer by yourself.
B. 1. compass.
2. seperating funnel.

12 Suez - Directorate of Education.

1 A. 1. opaque 2. dynamo
3. white 4. north pole
5. decrease 6. dinosaur
B.1. separating funnel.
2. prism.

2 A.1. decomposer.
2. secondary.
3. compass
4. solubility.
5. mutualism.
6. ecosystem.
B. Answer by yourself.

3 A. 1. tire. 2. inverted minimized.
3. yellow. 4. reflection
5. predator. 6. fungi
B. 1. It takes a fixed direction to the north.
2. Making a disturbance in the enviromental balance.

4 A. 1. (✗) 2. (✓) 3. (✗)
B. 1. Because it reflects sunlight.
2. Because it consists of more than one type of particles.
C. Answer by yourself.

13 Luxor - El Salam Language School

1 1. copper 2. distilled water
3. salt 4. yellow
5. straight 6. steel
7. parasitism 8. smallpox disease

2 A.1. opaque.
2. decomposer.
3. regular reflection.
4. enviromental balance.
5. magntic field.
B. Answer by yourself.

3 A. 1. grinding - shaking.
2. predation.
3. electric - magnetic.
4. soda water
5. Answer by yourself.
6. Answer by yourself.
B. Answer by yourself.

4 A. 1. evaporation.
2. magnetic attraction.
3. filtration.
B. 1. imbalance.
2. elephantiasis.
3. refracted.
C. Answer by yourself.

14 Aswan - Aswan Educational Directorate

1 A. 1. b. 2. a. 3. c. 4. c. 5. b.
B.1. identifying the main four directions.
2. converting the kinetic energy to electric energy.

2 A.1. (✗) 2. (✓) 3. (✓) 4. (✗) 5. (✓)
B.1. Because it consists of more than one particle.
2. Because it reflects sunlight.

3 A. 1. predation. 2. shadow.
3. magnetic field. 4. white
5. transparent.
B. Answer by yourself.

4 A. 1. d. 2. e. 3. a. 4. b. 5. e.
B. Answer by yourself.